

THE IRON AGE

THURSDAY, JANUARY 23, 1890

New Compound Steam Turbine.

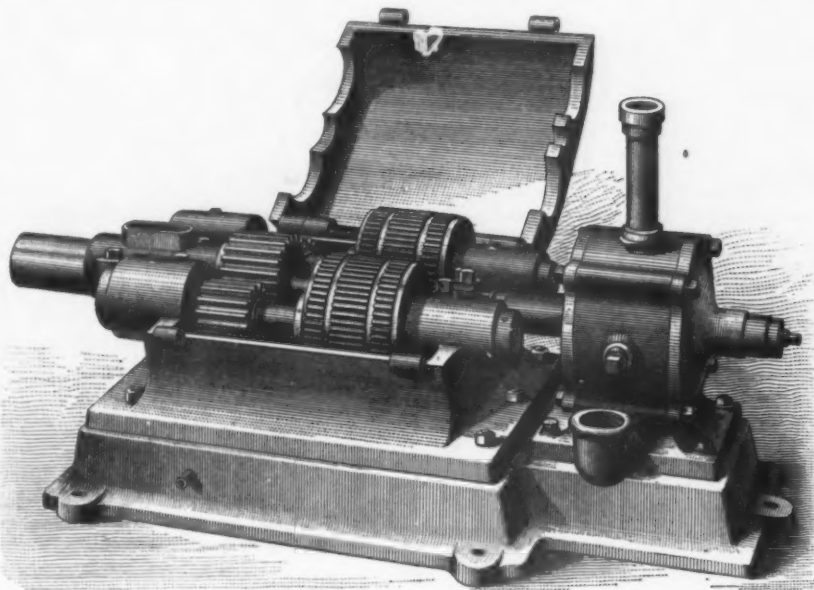
Some astonishment and much interest were manifested when, at the Erie meeting of the American Society of Mechanical Engineers, held last spring, it was stated by Ambrose Swasey, of the firm of Warner & Swasey, of Cleveland, that he was familiar with a steam motor which by actual count had run at a speed of 25,000 revolutions per minute. This so-called steam turbine is the invention of J. H. Dow, of Cleveland, who, at a recent meeting of the Civil Engineers' Club, of Cleveland, described its construction and performance in a paper which we herewith reproduce, together with the engravings from the *Journal of the Association of Engineering Societies*:

The new motor which you kindly permit me to show you is a compound steam turbine. It has six compoundings, and consequently uses the steam six times over; but the method of its construction would have permitted any desired number of compoundings. Its weight, as it stands, is 68 pounds. It has been used to run an elevator, a pump, a dynamo. When running the elevator it developed 4450 foot pounds of work for each pound of steam pressure. At this rate 70 pounds pressure performs about 10 horse-power of work. The consumption of boiler-feed water required to run the turbine at 70 pounds pressure is 585 pounds per hour, but the net evaporation is fully 20 per cent. less than this or 468 pounds per hour if two calorimeter tests taken at another time correctly show the average dryness of the steam. The consumption of steam per actual horse-

power per hour would then be $\frac{468}{10} = 47$ pounds.

Very recently this turbine has been coupled to the lighting dynamo at the Chisholm Steel Shovel Works, and with 70 pounds of pressure in the steam chest it has run 13 arc lights of the works at their full brilliancy. The speed of the turbine when running the elevator was 21,000 revolutions per minute; when running the dynamo with a 13-light current the speed was reduced between 16,000 and 17,000. In each case the speed was reduced by gears at an undetermined waste of power. Without gears, but by direct coupling, the turbine has successfully run a specially constructed rotary pump at a working speed of about 10,000 revolutions per minute, and the power developed was apparently as great as at the higher speed with gears. The speed of highest efficiency is theoretically more than 25,000 revolutions per minute, if the half velocity of the issuing steam determines the best velocity of the wheels; but I suspect that other factors enter into that problem and that satisfactory work may be done over a large range of speeds.

The spindle and propeller wheels which I hold in my hand constitute the entire running parts of the pump, which you, Mr. President, and several of the gentlemen present have seen in operation.* I will not say just how much water these wheels throw per minute through a 3-inch nozzle, but it is more than 20 barrels. The power of the steam turbine is explained by the principle that a jet of steam blowing into a vacuum will throw its whole energy into momentum. If, therefore, a turbine could be made which would utilize the entire momentum of the steam jet it would be equal in efficiency to a theoretically perfect piston engine. But the extreme lightness of steam compels a greater speed of motor than has ever been successfully used; and the elasticity of steam, as contrasted with the non-elastic nature of water, compels the compounding of the steam turbine, though compounding the water turbine would destroy its efficiency; for the momentum of the steam, though checked by the first series of buckets, recovers itself



NEW COMPOUND STEAM TURBINE.

instantly by expansion, and must be checked again and again by successive series of buckets until the steam has spent its expansive force.

Professor Webb, of the Stevens Institute of Technology, says that the steam turbine may develop mechanical energy "with a high degree of economy," provided that the difficulties of mechanical construction can be overcome. He says also, "The advantages of a successful turbine are too apparent to need mention, and I hope to hear of progress in this direction." Whether my new turbine is along this line of progress you may better judge after the following

DESCRIPTION.

Fig. 2 is an end elevation of the motor without the cover and end wheel. The lay-out of the stationary chutes or guide plates of the turbine is shown in full lines. Dotted lines show the wheel buckets.

Fig. 3 is a longitudinal section of the motor. The arrows show the direction of flow of the steam.

*There are two propeller wheels, a right and a left, mounted on a single shaft. Each wheel weighs 6½ ounces. The total weight of wheels, spindle and coupling to connect them with motor spindle is 2 pounds 3 ounces.

The interior of the shell is divided into three chambers by two partitions P P parallel with the covers. The central chamber A receives live steam by the steam pipe entering at the top. The chambers B B next to the covers are for exhaust steam, which is discharged from both chambers through a single exhaust-pipe E, which leads from a connecting passage between the chambers. The driving-spindle D is concentric with the chambers and is journaled in the hubs of the covers. It carries at the inner end of each exhaust chamber an aluminum bronze wheel W W of about 5½ inches diameter, whose inner face has six circular tongues and grooves concentric with the wheel. Into these engage similar tongues and grooves cut upon the outwardly presenting faces of flange disks F F, which are secured by screw threads into the partitions. All tongues bottom in their grooves, but they are separated from each other at the sides by annular spaces, the grooves being considerably wider than the tongues. Each

tongue upon disks is cut slantingly across at regular spacings by steam passages, analogous to the guide plate vents of water turbines; and similar passages, but inclined oppositely to these, cut across the wheel tongues like the bucket vents of water turbines. The wheels W W have long hubs, inward projecting, and the bore through the flange-disks F F is large enough to leave annular steam passages around the hubs. The hubs clamp a plain disk d, between them on the spindle midway of the steam chamber and this disk runs with equal clearance between the stationary-rings r r.

These two clearance spaces are the two steam ports, as shown by the arrows in Fig. 3.

Each port supplies only its own wheel with steam, which flows inward to the wheel hub, then along the annular space surrounding the hub to the inner series of buckets. These deflect its course, check its velocity and receive impulse by the reaction. The checked steam is then easily reversed in its direction by passage through the first series of stationary chutes, which have as in every series, a much larger aggregate area of discharge than the adjacent bucket vents. While the steam is passing through the chutes expansion is accelerating the velocity of the flow, to be again checked by reaction upon the second series of buckets. And so checked by reaction, and accelerated by expansion, alternate until finally the spent steam escapes from the circumference of the wheels into the exhaust.

An extremely slight end play is given to shaft, wheels and central disk, so that any disturbance of steam balance upon the opposing wheels will crowd the central disk toward one or other of the stationary rings r r. This movement partly closes

the port leading to the overpressed wheel, at the same time opening wider the other port, and the equilibrium restores itself. In practice an end play to the shaft and wheels of 0.005 of an inch is sufficient to prevent frictional contact of wheels against their seats. The annular spaces between buckets and stationary vents insure constant flow of steam and its even distribution around the circumference at each compounding, and whenever the speed of the wheels is below the normal, due to the velocity of the outflowing steam, there will be a circular rush of steam around these annular spaces which will impinge against the buckets and thereby assist to propel them. Hence the annular spaces enlarge the range of effective speeds.

The advantages claimed for this compound steam turbine are: Extreme simplicity, compactness, lightness and cheapness, freedom from friction and perfect steadiness of pull with consequent smoothness of action, also extraordinary storage of power in the momentum of the steam-wheels (about 10,000 foot pounds), giving

gear shaft and half by the other, to the pinions at the left of the train, both of which drive the gear between them with its shaft. This shaft runs at the speed of the dynamo, whose armature it drives by direct coupling. The total weight of motor and gears, mounted as shown, is about 400 pounds. The floor space occupied is 2 feet 9 inches by 1 foot 6 inches. At a not distant future day you may receive a report of tests of the efficiency of this turbine more accurate and reliable than any which I can give you. Nearly all the tests which I have made have been comparative, not absolute, but by their aid I have improved the motor little by little, to tenfold its first efficiency. Without doubt it may be and will be further improved.

DISCUSSION.

In the discussion which followed the reading of the paper Mr. Dow said: The Barker mill has commonly used water as the propelling fluid. The operation of steam is radically different from water, because steam is elastic while water is non-

Bliss, P. C. Cheney, George H. Ely and Thomas Dolan. Col. W. L. Strong was elected a manager to fill a vacancy. The following constitute the executive committee: Cornelius N. Bliss, New York; George H. Ely, Ohio; James Phillips, Jr., Massachusetts; Joseph E. Thropp, Pennsylvania, and P. C. Cheney, New Hampshire. The reports of the officers showed that the League have been vigorously at work and that their affairs are in a most satisfactory condition.

The steel forgings for the last 10-inch gun for the monitor Miantonomoh are being received at the Washington naval ordnance foundry and soon after they have all been delivered the Bethlehem Steel Company will begin the delivery of the first forgings for 12-inch guns ever made in this country. None of the new gun lathes capable of handling forgings of this size has yet been received at the foundry but Commander Folger has reconstructed some of the old lathes and lengthened

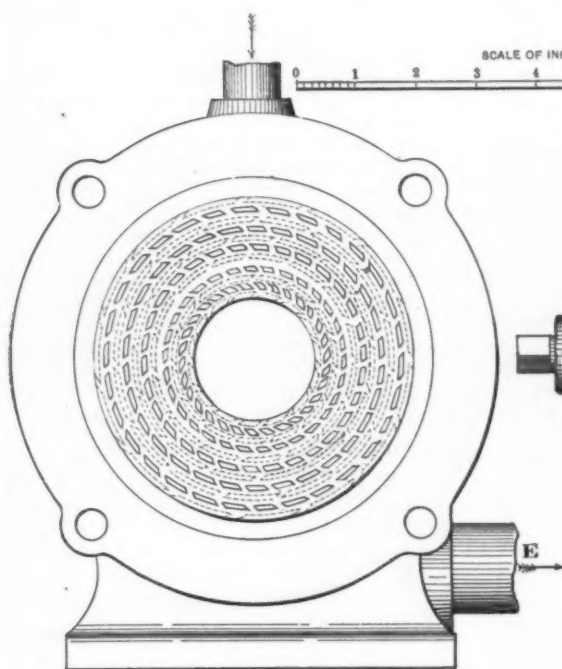


Fig. 2.—End Elevation.

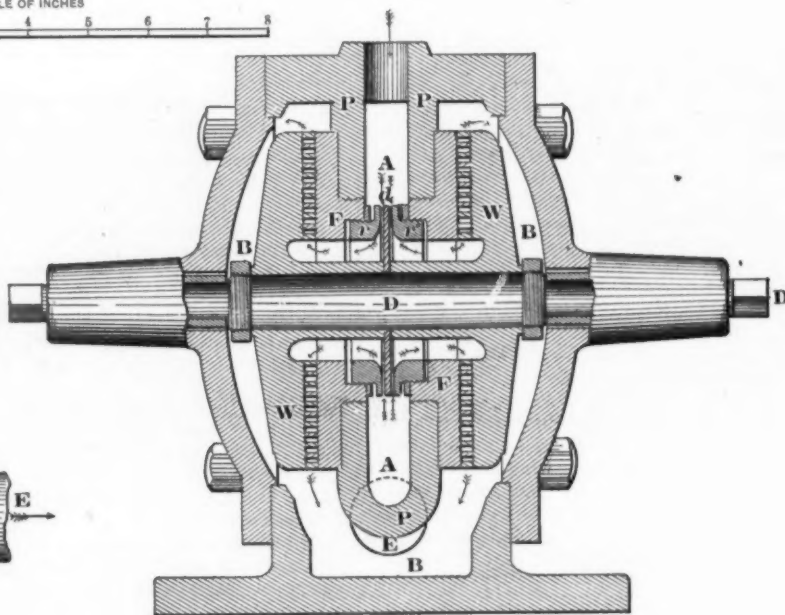


Fig. 3.—Longitudinal Section.

unusual steadiness under sudden changes of load.* In comparison with the reciprocating piston engine the steam turbine has the advantage that no part is subject to alternate heating and cooling; hence, steam expansion operates under more favorable conditions and may give better results. The turbine may use the highest steam pressure with advantage, for its normal speed under high pressure dense steam does not greatly exceed the speed required for the rarer steam of low pressure. The gyroscope principle is extremely developed by the steam turbine and may yet be utilized with startling effect. But undoubtedly the first call for the perfected steam turbine will be to run the dynamo by direct couplings.

The prospective view is from a photograph of the motor and reducing gears which drive the dynamo. The motor is the cylinder with bulging covers at the right-hand end of the bed plate. In line with the motor-driving spindle and coupled with it is a small pinion not seen in the cut, which runs between the two wide, triple-toothed gears at the right of the train and engages into both. The power is then transmitted, half by one

elastic. If I put water pressure in that turbine I fail to get any power at all, for all the force of water will be expended upon the first series of buckets, and succeeding series are worse than useless, they are hindrances. On the other hand the expansive energy of steam instantly renews momentum after each check at the successive series of buckets. In the respect of reactions this motor is like the Barker mill, but it is unlike the Barker mill, and like the water turbine, in that the steam first flows between stationary guide plates, and operates upon the buckets by impact in the direction of their motion, before reacting from them in the opposite direction. This double action of the fluid upon the buckets gives, theoretically, to the turbine double the efficiency of the Barker wheel.

The American Protective Tariff League held their annual meeting last week. The officers are as follows: Edward H. Amidown, president; Thomas H. Dudley, first vice-president; Robert P. Porter, second vice-president; Henry M. Hoyt, general secretary; Mahlon Chance, assistant general secretary, and Chester Griswold, treasurer. The following managers, whose terms had expired, were re-elected: Col. Le Grand B. Cannon, Cornelius N.

them out sufficiently to do the work and, as soon as the forgings come in, work will be commenced on them. The first four 12-inch guns turned out will be mounted on the double-turreted monitor Puritan.

Offices have been secured in the Colby & Abbott building, Milwaukee, for the headquarters of the Aurora mine, which are to be moved back to that city again from Cleveland. The Aurora is now controlled by the Colby syndicate. All of the mining properties controlled by the Gogebic and Penoque Development Company, which is the name of the Colby syndicate, will be actively worked next season. It is expected that the Ashland mine, which last year shipped 200,000 tons, will ship 500,000 tons this year; that the Aurora output will double from 200,000 to 400,000; and that the Colby will ship at least 500,000 tons. It is believed that altogether the syndicate's mines will ship 2,000,000 tons.

Glowing accounts come from the great State of Texas respecting her increase in population and wealth. Comprising an area of 275,000 square miles, she is greater in extent than the entire German Empire, and the new census is expected to show a population of 3,000,000, doubling the figures of the last. The crops for 1889

* A 1000-pound fly-wheel of usual portions, running 150 revolutions per minute would store about 8000 to 9000 foot pounds.

comprise 1,750,000 bales of cotton, valued at \$87,500,000; a wool clip of 25,000,000 pounds, which will net probably \$7,000,000, surpassing that of California and Ohio, while the value of the cattle exported is placed at \$8,000,000, making a grand total of \$102,500,000, not to speak of the largest corn crop in the history of the State. The State is making rapid progress in other directions. Some important iron industries have been founded recently in the eastern part of the State, where the State government is now running two furnaces and a New York syndicate is engaged in the development of three or four others. Its location being adjacent to the timber districts makes the necessary fuel cheap and easy of access. Coal is plentiful. Congress will be asked for \$5,000,000, to give Galveston Harbor a depth of 30 feet at the bar.

The Coke Operators on the New Wages Scale.

J. P. Brennen, general manager, McClure Coke Company; Morris Ramsay, superintendent, Southwest Coal and Coke Company; J. S. Schoonmaker, general manager, J. M. Schoonmaker Coke Company and Thos. Lynch, general superintendent, H. C. Frick Coke Company have signed the following reply to the communication of the coke workers in the Connellsville region, in which the latter presented a new scale:

We have carefully studied your scale for the regulation of wages presented to us for our consideration last Thursday. For our own information we analyzed that scale and figured out the wages that would have to be paid under it at the present selling price of coke. We also prepared a statement comparing the rates of wages now paid with the rate that would have to be paid for similar work at the present price of coke under your proposed scale, also, showing the percentage of advance of the latter over the former. The result was so surprising to us that we concluded that you did not intend it as it reads, and decided to give you the statement which we prepared and our analysis of the agreement as we read it:

	Present rate.	Scale rates for similar work on		Per cent. of advance.
		\$1.50 coke.	\$1.75 coke.	
Wet heading, open light.....	\$1.20	\$1.30	\$1.51%	26.3
Wet heading, safety.....	1.20	1.36%	1.59%	32.7
Dry heading, open light.....	1.10	1.20	1.40	27.3
Dry heading, safety.....	1.10	1.26	1.47	33.6
Dry room, open light.....	.95	1.05	1.22%	28.8
Dry room, safety.....	.95	1.10%	1.28%	35%
Wet room, open light.....	.95	1.15	1.34	41
Wet room, safety.....	.95	1.20%	1.40%	48
Drawing ribs, wet places, open light.....	.95	1.15	1.34	41
Drawing ribs, wet places, safety.....	.95	1.20%	1.40%	48.1
Drawing ribs, dry places, open light.....	.95	1.05	1.22%	28.8
Drawing ribs, dry places, safety.....	.95	1.10%	1.28%	35%

Average percentage of advance of above on present prices of coke, 0.35.

In addition to the above prices called for in the proposed scale we must pay 3 cents per 100 bushels in rooms, ribs and headings where a binder is found 2 inches thick, which means every working place in almost every works in the region, and when headings are worked two or three shifts, which is the rule in the region in new work, 10 cents per 100 bushels is to be added to the above scale prices for heading work. We are also required by the proposed new scale to lay part of the roads for the miners working in rooms and draw the posts for miners working in ribs, all of which has been unknown heretofore

in the region, and which we estimate at 15 per cent. advance, making a total of 50 per cent. for miners.

	Present rate.	Asked, \$1.50 coke.	Asked, \$1.75 coke.	Advance, Per cent.
Drawing coke, per 100 bushels charged....	\$0.55	\$0.62	\$0.72%	31%
Drawing select coke, per 100 bushels charged.....	.55	.60	.70%	44.2
Drivers using safety lamps, full run, average of 10 hours....	2.00	3.10	3.62	81
Drivers using open light, full run, average of 10 hours....	1.90	2.95	3.44	81.1
Trapper (boy's) safety lamps, full run, average of 10 hours....	.75	1.45	1.69	125
Blacksmiths per day, 10 hours.....	{ 2.20 to 2.50	3.57%	4.17	77.4
Yard, common laborer, 10 hours....	1.40	2.40	2.80	100
Firemen, gas or coal, per turn.....	1.70	3.50	4.08%	140.2
Carpenters, per day, 10 hours.....	{ 1.75 to 2.00	3.30	3.85	97.4
Charges with engines.....	1.75	2.95	3.44	96.6
Pumpers, per turn, 10 hours.....	{ 1.75 to 2.00	3.64.2	4.35	126.6
Dumpers and tipples, full run, average of 10 hours....	1.75	2.82	3.29	88

Average advance of drawers and day men, 90.7 per cent.

Your proposed scale means abandoning a part of the ovens at about one-half of the works in the region, as it is absolutely impossible to operate the large plants full in the time and under the conditions and restrictions named in the scale, consequently a large number of men will be thrown out of employment. It calls for as high as 48 different prices for mining in the same mine, and in no mine less than 15, and it is possible for one man to have all of these rates in one month. It assumes to be based on the selling price of coke, yet miners working in the same mine at the same kind of work are paid different wages, and the coal mined by these men at different rates may all go into the same oven and the coke therefrom sold to the same party at one price. The miners and others employed in Standard mines will get 5 per cent. more than the men doing the same work in Alice, Morewood, Mammoth, United, Central and Tarr mines. The miners and others employed in Davidson mines, Leisenring No. 2 and No. 3, will receive 5 per cent. less than men employed at similar work in Trotter and Leisenring No. 1 mines. Men employed in Leith mines will receive more pay for the same kind of work than will be paid to those employed in Redstone, Lemon and Oliphant mines. Rough blacksmiths who sharpen picks, weld scrapers and do other rough work about the mines, are classed with the highest skilled machine blacksmiths. The hatchet and saw carpenter who makes side-boards for wheel-barrows and repairs pit cars, is classed with the highest skilled carpenter. All other mechanics are classed the same way regardless of their skill or the amount of work they have to perform. The fireman with only one boiler and using natural gas for fuel, generally an old man or a crippled man, must get the same pay as the hard-worked fireman who has six or eight boilers to fire and uses coal for fuel. The coke drawer who wheels all his coke into the car gets 10 cents per oven less than the man drawing, possibly, the very next set to him, and who wheels only the coarsest part of his ovens into the car and bitches the fine behind him on the yard. Heretofore coke drawers generally looked upon leveling as a promotion, and the rule for levelers has been to have from 35 to 30 ovens making his wages from \$2.50 to \$3 per day. Under the scale he cannot have more than 20 ovens,

and at the price given in the same for levelers at the present price of coke, his wages would be limited to \$2.56 per day; a reduction from what they are now getting, and about 15 cents less than a common laborer must be paid under the scale. Notwithstanding that the scale gives the boys who drive the mules in the mines more wages than the mine bosses get, we must keep a small army of men to harness and unharness, curry and clean their stock for them.

Under the scale we could not advance the price of coke to enable us to pay you your demands as we did the last time, because on the minimum wages given in the scale it would cost more to produce a ton of coke than the selling price, and as wages are to be increased in exact proportion with the increase in price of coke, we would be no better off with \$2, or any other price of coke than we are with \$1.50 coke.

After the above scale had been presented and discussed by those present without an agreement being reached, it was decided to appoint a compromise committee consisting of three men from each side. On part of the operators, Thomas Lynch, general superintendent of the H. C. Frick Coke Company; F. C. Van Dusen, superintendent of the Stewart Iron Company, and John P. Brennan, general manager of the McClure Coke Company, were named. On part of the workers, R. D. Kerfoot, master workman of Sub-Division No. 4, National Trades Assembly No. 135, Knights of Labor; James Keegan, of the Executive Board, and James Angus were named. This committee has taken the scale presented by the workmen and that presented by the operators, and from the two will endeavor to formulate a new one which will be satisfactory to operator and workman. The opinion is prevalent that a settlement of the matter will be reached.

Fire Hazard of Oils.

Mr. George H. Hurst, F.C.S., of Manchester, England, recently gave an interesting lecture there on oils as illuminants, lubricants "and for manufacturing purposes." The lecturer dealt first with the origin of the oils, explaining how the fatty oils are obtained from animal and vegetable matters, and the use of such oils for soap making, paint mixing and other purposes. He also showed by means of diagrams the plant used for obtaining the hydrocarbon oils from shale and crude petroleum. The main products from shale and petroleum are said to be naphtha, burning oil, lubricating oil and paraffine wax. It was shown by experiment how to obtain the flash point of oil, the fatty oils having the highest flash point, about 600° F. Fatty oils being natural oils, the flash point, it was said, could not be altered, but mineral oils can be got at any flash point according to their degree of refinement, 350° F. being considered safe for a machinery lubricant, 470° F. for cylinder oil. The influence of oils in producing the spontaneous combustion of cotton or wool was referred to; this was explained as being due to the property which oils possess of absorbing oxygen from the air, giving rise to the production of heat; if the absorption is great, the heat may rise sufficiently high to cause the cotton or other fiber to take fire. Those oils which, like linseed, cotton and rape oils, absorb oxygen readily are the most liable to produce spontaneous combustion; olive, lard and similar oils are not so liable; while the hydrocarbon oils, being free from the property of absorbing oxygen, do not produce spontaneous combustion. Oils for woolen manufacturing were referred to, and olive, lard and cloth oils were considered safe, but cotton-seed-oil was condemned as dangerous for the reasons above named.

Switching-Valve for Compound Steam Engine.

In an invention lately patented by Charles P. Deane, of Springfield, Mass., a "switching-valve" is so arranged in rela-

its seat, as shown in Fig. 5. Direct steam from the boiler received through the main inlet *e* is carried, not only to the smaller cylinders through branches *g* and *g'* and valve-chests A and A', but also to the larger cylinders through pipe *t*, passage *u*

restore the engine to its original and usual character. Communication through pipes *t* and *r* will then be cut off, as shown by the relative positions, Fig. 4, of the openings *u* and *i* in the valve and *t* and *r* in its seat. Direct steam will in the same manner as above described be carried to and will actuate the smaller cylinders, but the exhaust steam therefrom will then pass, as shown by the arrows in Fig. 1, through pipes *b* and *b'*, chambers *s* and *v* in the valve and pipes *d* and *d'* to the valve-chests B and B' of the larger and (as they will then be) low-pressure cylinders, and after use therein will be finally exhausted through branches *z* and *z'* and the main outlet *k*, as above described.

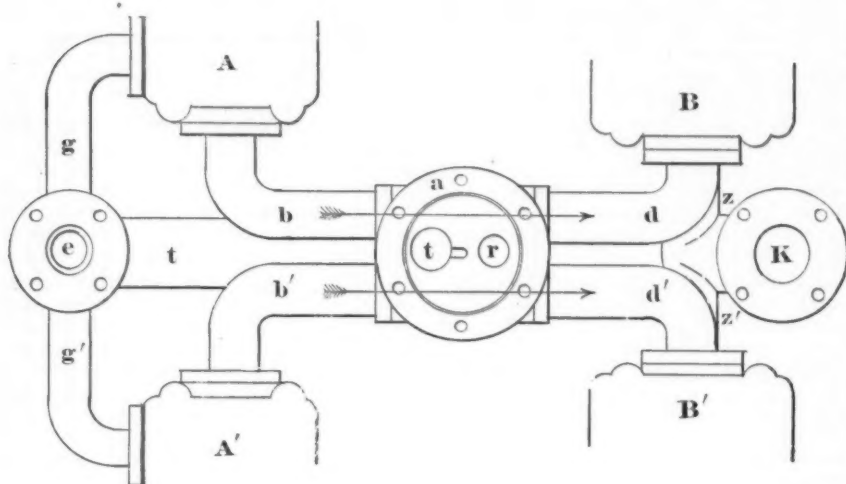


Fig. 1.—Plan View of Switching Valves and Connecting Pipes.

tion with the connecting and main steam and exhaust pipes and the cylinders of a compound direct-acting engine, that the engine may be instantly converted into two simple engines, which, though operating in conjunction are independent in that each receives its steam directly from the boiler and each exhausts freely to the atmosphere or to a condenser, thus largely and immediately increasing, when desirable, the power of the engines.

In Figs. 1 and 2 the cylinders of the duplex-engine indicated may be considered as represented by their valve-chests A high-pressure and B low-pressure. The shell *a* of the switching-valve *e* is connected by the two pipes *b* and *b'* with the two high-pressure cylinders through exhaust openings below their valve chests, as shown for the pipe *b* at *m*. The valve is connected with the low-pressure cylinders by the pipes *d* and *d'*. Of the two pipes shown in section in Fig. 2, pipe *t* connects the valve-shell with the main steam-inlet *e*, and by branches *g* and *g'* with the high-pressure cylinders through their valve-chests, while pipe *r* connects the shell with the main exhaust outlet *K*, and by branches *z* and *z'* with the low-pressure cylinders through their exhaust-openings.

The switching-valve is a solid cylinder, except that on each of two opposite sides a portion of it in form of a segment is removed, the cavities so made and the adjoining sides of the shell forming two chambers, *v* and *s*, from each of which, as shown by dotted lines, extends an interior separate passage, *u* or *i*, through the valve to its lower end, which, with the openings of these passages, is shown by Fig. 3. The openings of the pipes *t* and *r*, Figs. 1 and 6, in the bottom of the valve-shell correspond with the two similar ones in the valve, as shown in Fig. 3. The recess *y*, Fig. 6, and the small opening *x*, Fig. 3, to a corresponding passage through the valve (shown by dotted lines, Fig. 2) allow steam to pass from pipe *t* to the space above the valve to hold it firmly to its seat. The valve, if desired, may be ring-packed and may be moved by a hand-wheel *l*, pinion *o* and sector *p* of the raked wheel attached to its rod *q*. The position of the valve, as shown in Fig. 2, is that given to it when it is desired, as in the emergency of a fire (where the engine is used for pumping), to greatly increase the effective power without change of the boiler pressure. The openings *u* and *i* in the valve now coincide with *t* and *r* in

and chamber *s* in the valve, pipes *d* and *d'* and valve-chests B and B', while the exhaust from the smaller cylinders is now



Fig. 3.

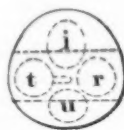


Fig. 4.

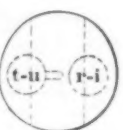


Fig. 5.

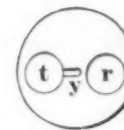


Fig. 6.

carried through pipes *b* and *b'*, the chamber *v* and passage *i* in the valve, and the pipe *r* to the main exhaust outlet *k*,

A Visit to the Krupp Works.

A correspondent of the *National Car and Locomotive Builder*, who signs the initials "A. S.," describes as follows a visit to the famous Krupp Works, at Essen:

We were led cheerfully along to the ordnance department, and were shown small guns and big guns in all stages of manufacture, from the rough ingot to the finished cannon with all its elaborate mechanism ready for beginning its work of destruction. Some of the boring and rifling appliances were very ingenious, but a description would hardly be interesting to our readers. Guns weighing 120 tons have been made in these works, but the heaviest ones which we saw were 100 tons. These immense engines of war had the barrel about 40 feet long and 4 feet diameter at the breech. The ponderous tube which forms the core of the gun is, like all the other parts, made of the best crucible steel. The ingot from which this tube for the largest guns was forged is said to have weighed over 77 tons. It took the contents of 1800 crucibles to cast the ingot. A mechanic can readily conceive the vast amount of work called for to roll and forge this ingot into the form of a shaft, then bore and turn away about half the material. After this is done, two sets of huge concentric rings have to be shrunk on the tube, and again the latter has to be bored out to overcome the distortion caused by the shrinking process.

The machine-work produced is admirable, whether it be the minute work on fine dies or the accurate fabrication of massive machine-gun mechanism; but the tools with which the work is done have no striking merit. The heavy tools are particularly heavy and are sufficiently

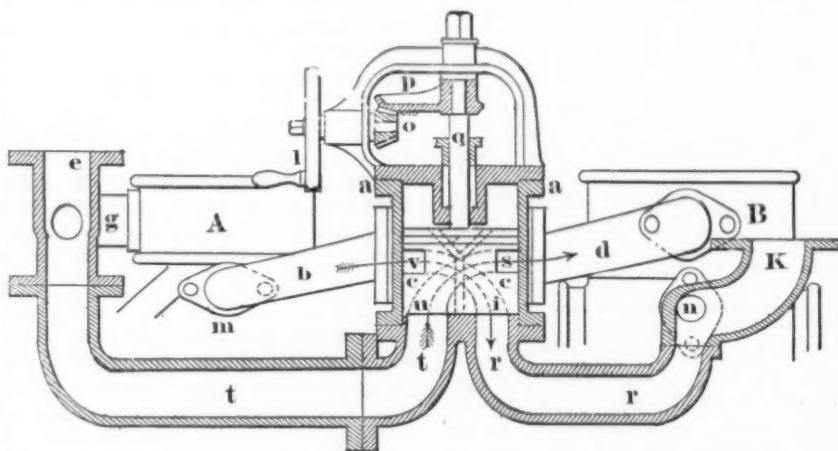


Fig. 2.—Vertical Section Fig. 1.

through which, by connecting branches *s* and *v*, the exhaust steam from the larger cylinders passes with that from the smaller to the atmosphere or a condenser. A movement of the valve equal to one-quarter of a revolution will immediately

stiff to insure accuracy; but heavy and light tools were alike deficient in minor conveniences that American manufacturers regard as being necessary to facilitate production. The magnitude of the works and the ponderous nature of the operations

that appeared on every hand were profoundly impressive; but we could not help noticing that the high character of the productions was due more to personal skill and persistent manipulation than to highly perfected or ingenious mechanism.

Although there was little of what Americans, with their genius for specialties, would call perfect tools, there were everywhere evidences of a perfect system of carrying on operations. The arrangements were such that the work always kept moving onward without any retrograde movements. The big forgings or castings started from certain points, and every successive furnace, pit, tool or machine they visited brought them one step nearer the finished goal. Thus the big guns that are like magnets to our attention are turned in one shop, then they pass to another to be bored, further on the rifle-grooves are cut, and then they are taken to a point where the breech mechanism is fitted, and in every move they are following a course that keeps them clear of other work. I have written about the gun manufacture first, because that was the first place we visited, but it was by no means the department that excited our greatest interest, attention and curiosity. While yet in the gun department we had been shown mild-steel castings of extremely intricate form that machined as clear from blow-holes as any forging. We were very desirous of learning how the casting was performed that produced such compact metal. In the same open-hearth department was the material produced for the axles, wheels, boiler-plates and other railroad stock in which we were particularly interested. To that department we went, we saw and we did not conquer. The excellence of the Krupp product that finds its way into railroad rolling stock is admitted. We expected to learn something about how the superiority is obtained. We stood around and watched them pouring all kinds of steel castings. We saw the successive operations that tires go through on the way from the ingot to the tire ready for going on the wheel. We paid close attention to the manufacture of wheels and axles. We had seen similar operations in American metallurgical works, and we could not perceive any marked difference, except that most American steel-works appear to have better plant and more business-like machinery than they have at Krupp's. There are no doubt forces at work emanating from knowledge and skill that are not apparent. Manipulation was very persistent in every stage of the work. Visitors are not likely to carry away any of the secrets of steel-making or of any other occult arts practiced at Essen. The only peculiarity that could be noticed about the castings was that the pouring-gate was particularly large.

The open-hearth plant is very large and is arranged well. There are two long rows of Siemens-Martin reverberatory furnaces facing each other, with a casting-pit floor between them. Here there are fairly good facilities for handling the flasks, molds and material, and good means of transport are provided for taking the castings to the points where succeeding work upon them is done. In some places a plant like the open-hearth or the Bessemer that are in Krupp's would be considered something worth showing; but here the cast-steel business appears to overshadow all other departments. This is natural, for the cast-steel product has made the works famous. An interesting part to us was the pouring of crucible cast-steel ingots from which railway tires are rolled. This is an important section of the works, but the visitor can learn nothing of the secrets of mixing that give the steel the wonderful combination of great tensile strength

combined with ductility. The operations appear in no way different from other works where cast-steel is made.

Our New Navy.

Secretary Tracy has been before the House Naval Committee to give expression to his views concerning the navy. In substance he said that the time has come when this country should building some fighting vessels of the first order. Already we have made quite an advance in naval construction and have built some cruisers that have proved to be very useful ships, but we should begin to build some armored fighting vessels—he did not undertake to say how many—as large as the depth of water in our harbors and other conditions which obtain in this country, permit, and of the most powerful types. The Secretary had with him some designs prepared by the McCann Board, which embodied his views of the kind of ships we should build. They were not marked out in absolute detail, but contained sufficient data to inform the committee sufficiently as to their general type and probable efficiency.

One of these vessels is to be of 7500 tons, and her design presents some remarkable features, which may be more clearly understood by the non-professional reader from a statement of the results they are expected to give, namely, a speed of between 21 and 23 knots an hour; ability to cruise 16,000 miles on one coal supply; guns equal to anything afloat, and a battery so arranged as to enable the fire of the entire armament to be concentrated upon any point of the horizon. The Secretary believed that a vessel of such exceptionally high speed and power would be able to contend at sea with the best vessels of foreign navies.

It is said that the scheme of the McCann Board comprises the following vessels, the estimated cost of which, with armament complete, is appended: Ten battle ships of 10,000 tons, \$5,000,000 each; eight of 8000 tons, \$5,000,000 each; twelve of 7000 tons, \$4,500,000 each; five of 6000 tons, \$3,600,000 each; ten rams of 3500 tons, \$1,800,000 each; nine armored cruisers of 6250 tons, to make 19 knots an hour, \$3,300,000 each; four protected cruisers of 7400 tons, to make 22 knots an hour, \$3,500,000 each; nine protected cruisers of 5400 tons, to make 20 knots an hour, \$2,800,000 each; two protected cruisers of 4000 tons, to make 19 knots an hour, \$2,050,000 each; five special cruisers of 1200 tons, to make 18 knots, \$500,000 each; fifteen torpedo cruisers of 900 tons, to make 22 knots an hour, \$500,000 each; three artificers' ships, \$2,000,000 each. The eight ships which Secretary Tracy recommends in his report shall be begun at once are not the eight proposed by the McCann Board, but eight of the first ten. The reason why work on these is recommended to begin at once is that several years will be required to domesticate the manufacture of materials and guns required.

A Chicago daily paper states that the Grinnell Agricultural Implement Company, of Grinnell, Iowa, one of the largest manufacturing concerns in the West, has about closed negotiations whereby it will come into possession of a 40-acre tract at Washington Heights, near Chicago, to which it will remove its extensive plant during the year. The land in question is located below the crossing of the Rock Island and Pan Handle Railroads, fronting north on South street, and lying between Forest and Sylva streets. It is owned by non-residents, whose interests are represented by the International Bank, and the negotiations are in the hands of B. F. Clark. The plant, it is stated, will occupy only about 20 acres, and it is likely

that the additional 20 acres are being bought for sale and improvement hereafter. When the works are completed and in running order employment will be given to 400 or 500 people. Work will be commenced on the new plant in the spring.

The Chignecto Ship Railway.

The Canadian ship railway across the Isthmus of Chignecto, permitting vessels to make a short cut between the Gulf of St. Lawrence and the Bay of Fundy, is so far advanced in the work of construction that it will be in operation before the close of 1890. The road-bed is ballasted and ready for track laying, and the docks at either end are in process of construction. The steel for the track is the heaviest ever made and weighs 110 pounds to the yard. There will be a double track, upon which the cradle containing the vessel under transport will be placed. The locomotives, two of which will be used in drawing the vessel across the isthmus, are built on the same principle as ordinary engines, but of much greater weight and power.

The vessels to be transported will be hoisted by hydraulic power from the basin to the track, and it is estimated that with this power and the road-bed in good condition a ship of ordinary capacity will be taken from the Bay of Fundy and placed in the Gulf of St. Lawrence in two and a half hours, saving a detour of 500 miles in the trip to St. John, Boston or New York. The tariff for lifting and hauling vessels over the railway will be \$750 for a vessel of 1000 tons. The permanent success of the scheme is looked upon as highly problematic, the class of schooners engaged in this trade at present being unable to bear any such charges.

Transportation Trade of the Northwest.—The struggle for ascendancy in the transportation trade of the Northwest threatens to bring the two great "Northern gladiators," the Northern Pacific and Manitoba Railroad, into a fierce combat. The former having now at control more ample means, proposes to assume the aggressive. The *Superior Inter-Ocean* says: "With a line 2000 miles long, from the lakes to the Pacific Ocean, the Northern Pacific must always find its greatest profit, if it does the business at all, in its through traffic. But it is now entering upon so bold a scheme of branch extensions in the Northwest that in a short time its business in the center of North America must bring it a royal revenue if retained. It has now, as it believes, secured the means whereby to retain both its through traffic from ocean to ocean, and also that in the Northwest, which it is already competing for, not to speak of that which it is striving to develop by new lines." The company have six steel steamers which did an enormous business last season, and, as stated in these columns last week, contracts have been closed with Carnegie for 5000 tons of steel plates for the American Steel Barge Company for ten more vessels, four of which will be steamers. Hodge, of Detroit, will build the engines, and most of the hulls will be constructed at Duluth. Shipping on the lakes, we are told, will this year undergo another great transformation scene.

M. Germain, president of the French Commission, appointed to examine the canal at Panama, reports favorably respecting the condition of the work, and that France is ready to redouble her efforts for its completion. It only rests with the Colombian Government, he says, to grant an extension of time in which to overcome the natural difficulties.

Steel Pressure-Blower.

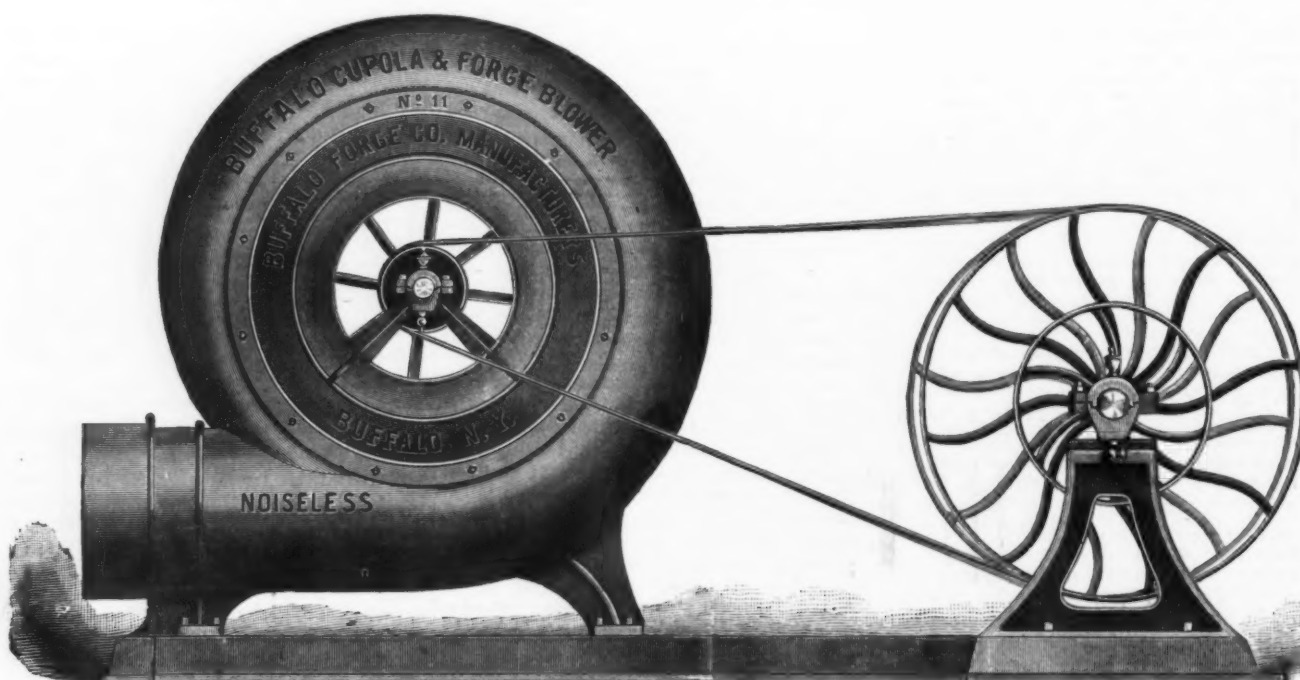
The annexed engraving illustrates a Buffalo steel pressure-blower mounted on an adjustable bed and provided with countershaft. It is designed and constructed with special reference to high-pressure duty, such as supplying blast for cupola furnaces, forge fires and sand-blast machines, also for forcing air long distances. By means of a tightening screw the blower may be moved upon the bed while running at full speed, taking up any slack, giving both belts a uniform tension which is regulated at the will of the operator, and is an important point in preventing the inconvenience and loss incurred by a stoppage during heat when blowers are used for cupola purposes. A decided saving by use of the bed is gained in the wear and tear of belts, for a simple turn or two of the nut on end of adjusting screw and retightening of the holding-down bolts takes but a moment or two and accomplishes the same end as relacing of the belts, which usually is put off until the belt will run no longer on account of so

by lock nuts. These blowers are made by the Buffalo Forge Company, Buffalo, N. Y.

Marquette's Dock Facilities.—According to the *Mining Journal* the management of the Duluth, South Shore and Atlantic Railway have let a contract for the extension of No. 3 ore-dock, at Marquette, Mich. By the terms of the contract the work is to be completed May 1, 1890. The contractors are Messrs. Henry & Balch, of Minneapolis, the firm that built two large docks at Ashland for the Milwaukee, Lake Shore and Western and one at the same place for the Wisconsin Central. No. 3 dock is to be extended as far as the harbor limits will allow. That will make the dock about 600 feet longer and increase its capacity about one-third. The pockets will be changed from 13-foot to 12-foot centers, having each a capacity of about 90 tons of ordinary hematite. The construction of an entirely new dock, to be known as No. 4, is also one of the possibilities of the season. But no definite information can yet be given about that

this ought to give them at least \$20,000, but even then there would be very little chance for profit. It will cost very nearly as much to build her as one of the 1000-ton gun-boats, for which \$350,000 each is appropriated. The firms that have thus far asked for plans and specifications of these three vessels are Samuel Moore & Sons, of Elizabethport, N. J.; N. F. Palmer, Jr., & Co., of New York; the Atlantic Iron Works, of Boston; the Bath Iron Works, of Bath, Me.; the Columbian Iron Works, of Baltimore; Charles Reeder & Sons, of Baltimore, and the St. Louis Sectional Dock Company, of St. Louis. The last-named firm have not heretofore been looked upon as competitors for naval contracts, but these vessels, or even larger ones, could easily be built by them and taken to the sea by way of the Mississippi.

A new board of electrical control is provided for by a bill introduced in the New York Legislature, with the design of securing a more effective organization than that now in existence. The board is to consist



BUFFALO STEEL PRESSURE BLOWER.

much slack. Special attention should be directed to pressure-blower belts on account of the high rate of speed at which they must necessarily run and absolutely perfect alignment of the countershaft with the blower is essential in order to secure smooth running, even tracking and to avoid undue wear of belts by slipping.

A telescopic mouth-piece is employed in order that the blast-piping may not be disarranged in moving the blower on the bed, while sufficient length is afforded to the countershaft so that tight and loose pulleys can be used for main driving belt, a self-oiling device fitted to the countershaft enables it to be run at high speeds for long periods of time without heating or cutting. A prominent feature of these blowers is the solid case, the peripheral portion of the shell being cast in one solid piece dispensing entirely with the objectionable "putty joint." Thus being practically one piece, under the hardest service the bearing must always be in perfect alignment vertically and laterally with the rest of the machine. The journals are long and heavy, in the standard ratio of length to diameter of 6 to 1, with cap bearings secured by bolts screwed in the lower half of bearing held in place

enterprise. It seems, however, that the Duluth, South Shore and Atlantic contemplate making Marquette the equal of any of the upper peninsula ore-shipping ports. The last season's shipments from this port amounted to about half of the shipments from Escanaba, while they fell about 200,000 tons short of Ashland.

There is some doubt as to whether the bids for the two 1000-ton gun-boats and the Naval Academy practice cruiser will be found to be within the limits of the appropriation. Congress fixed the limit of the cost of this vessel at \$260,000. From this must be deducted about \$25,000 for the armament, leaving only \$235,000 for the hull and machinery. The contract price of the Petrel was \$247,000, and the practice cruiser, while a trifle smaller than the gun-boat, will cost more to build, as while the Petrel has only one compound engine and a single screw, the practice vessel is to have two triple-expansion engines and twin screws. She is also to have a protective deck, coal protection, electric-light plant and all late improvements. Her builders will receive a premium of \$5000 for each $\frac{1}{4}$ knot above 12 knots an hour, and

of three commissioners, one Republican, one Democrat and one expert who is versed in the science of electricity. The commissioners are to be appointed by the Governor, by and with the consent of the Senate. They are to hold office for five years and receive a salary of \$8000 a year and additional expenses for traveling. A chief clerk or secretary, to be appointed also by the Governor, shall be the executive officer, and his politics shall be different from those of the expert. This plan is regarded as the best to insure a non-partisan character to the board. The secretary's salary is fixed at \$4000 a year. The principal office of the board shall be at Albany, a branch at New York and another branch wherever in the judgment of the commissioners is necessary. Monthly meetings shall be held at Albany. The board is endowed with powers similar to those of the Railroad Commission, such as administering oaths, in having "general supervision of all the telegraph, telephone, electric wire, motor, subway, conductor or conduit associations, companies or corporations, and all corporations and associations that in any manner utilize the electric fluid for the public use or for the purposes of commerce."

Pig-Iron Warrants in London.

With the commencement of the new year a pig-iron warrant market has been established in London, similar to the one held in Glasgow. It is claimed that London is the center from which so large a proportion of the warrant business hitherto transacted in Glasgow has emanated makes it the natural home for such a market, and, moreover, the facilities for financing are so much greater in London than in Glasgow that even if no other reason existed this alone should render the transfer of the market to London a necessity. The dealings here will be in hematite, Cleveland and Scotch pig warrants. We are indebted to Sanders & Co., 110 Cannon street, for the following copy of the rules:

Code for Contract V.

RULES.

No. 1. Members are responsible to each other and to each other only for the fulfillment of every contract in which another principal is not mentioned by name.

No. 2. All disputes arising upon contracts shall be referred to two arbitrators, one to be chosen by each party in difference, the said arbitrators having power to call in a third in case they shall deem it necessary. In the event, however, of one of the parties appointing an arbitrator, and the other refusing or neglecting to do so, for seven days after notice in writing of the appointment (such notice being delivered personally or left at the usual place of business of such other party), or in case of the death, refusal to act or incapacity of either of such two arbitrators; then, upon application of either of the disputing parties, the question in dispute shall stand referred to the arbitrator named by one of the contending parties and another arbitrator, who shall be appointed by the committee of the London Metal Exchange, at a meeting convened by notice, and at which no less than three members shall be present. In case the two arbitrators appointed as aforesaid, whether originally or by way of substitution, shall not within 14 days after their appointment agree to an award or choose a third arbitrator, then the committee of the Metal Exchange, at a meeting constituted as hereinbefore provided, shall appoint a third arbitrator, and shall, in case of death, refusal to act, or incapacity of any of such three arbitrators, from time to time substitute a new arbitrator or arbitrators in the place of the arbitrator or arbitrators so dying, refusing or incapacitated. In making their award the arbitrators shall state which party or parties are to pay expenses of arbitration, and the award of two arbitrators, in writing, shall in every case be conclusive and binding on the parties to the arbitration. The submission to arbitration hereby made may, on the application of either party in difference, be made a rule of any one of the divisions of Her Majesty's High Court of Justice.

No. 3. Sellers shall tender documents not later than 3.30 p. m. on the prompt or settling day.

No. 4. Prompts falling on a Saturday shall be settled on the preceding Friday; and those falling on a Sunday shall be extended to the Monday following. Those falling on bank holidays shall be extended to the day following. In all cases rent shall be allowed by sellers to the day of settlement.

No. 5. If sellers fail to deliver on the prompt day buyers shall be entitled to buy in against them, either publicly or privately, on the next morning's Change; or if buyers fail to take delivery on the prompt day sellers shall be entitled to sell out against them, either publicly or privately, on the next morning's Change; and the person or persons in default shall at once pay the loss, if any, by re-purchase or re-sale, or receive the profit, if any, in like manner. Buyers or sellers claiming to act under this clause shall send written notice on the prompt day to the person or persons in default, that action in conformity herewith will be taken.

No. 6. When buyers and sellers agree to settle outstanding contracts between them by a difference account, such differences shall be calculated on the exact contract weight without any reduction whatsoever therefrom.

No. 7. On contracts made with an open prompt warrants sold for settlement within 7 days may be called up on buyers giving 1 day's notice, those beyond 7 days and within 14 days on giving 2 days' notice, those beyond 14 days and within 1 month on giving 3 days' notice, those beyond 1 month and within 2 months on giving 5 days' notice, those beyond 2 months and within 3 months on giving 7 days' notice.

No. 8. Two or more days' notice must include one clear market day, e.g.:

Two days' notice from Thursday comes due on Monday.

Two days' notice from Friday comes due on Tuesday.

Three days' notice from Wednesday comes due on Friday.

Three days' notice from Thursday comes due on Monday.

Three days' notice from Friday comes due on Tuesday.

Five days' notice from Monday comes due on Friday.

Five days' notice from Tuesday comes due on Monday.

No. 9. Notices calling up contracts or loans can be given on a market day only, and must be delivered in writing not later than 3.30 p. m.

No. 10. Buyers shall accept warrants of Messrs. Connal & Co.'s, limited store, in any name or names, provided the same be duly endorsed, and they receive the usual transfer fees, which shall in all cases be payable to the parties taking delivery of the warrants, unless when by mutual agreement the warrants have been put into a special name or names.

The London Economist refers to the movement of dealing in pig-iron warrants at the London Metal Exchange in the following terms: Both Scotch bankers and Scotch iron brokers are somewhat concerned at the action of the London Metal Exchange in resolving to hold two markets daily for dealing in pig-iron warrants. There is a fear that this is the beginning of an effort to transfer the headquarters for such transactions from Glasgow to London, and it is, therefore, no matter for wonder that the Scotch ring should be resolved on concerting measures for the prevention of such an event, the consequences of which would be serious to many local interests. But if the change should ever come about, probably the, at times, inconsiderable action of a few of the Scotch banks will be more responsible than any other cause. Some of these institutions have, so to speak, specially laid themselves out for financing on pig-iron warrants, and no more profitable branch of business has ever fallen to their hands, but lately, largely from personal considerations, which are one of the weaknesses of provincial commercial life, obstacles and difficulties of a financial nature have been thrown in the way of merchants, much to their inconvenience and that of their clients. As a result, in fact, of the action of certain Scotch bankers warrants for 50,000 to 60,000 tons of Cleveland iron have been transferred to the keeping of London bankers, who recognize warrants as among the safest of securities, and whose loan charges are moderation itself as compared with those that rule north of the Tweed. It is a logical conclusion that if warrants come to be deposited in the metropolis in any volume and a free market created there for dealing, the Glasgow "ring" may gradually be deprived of no inconsiderable part of their business and ousted from their present influential and valuable monopoly. The members of the Scotch Pig Iron Association have, therefore, determined to guard their position so far as possible, and at least to offer no facilities toward the diversion of business to London. Their resolution on the subject came to at a meeting this week is: "That members shall not do business in Scotch, Cleveland or hematite warrants unless subject to the rules and usages of the Scottish Pig Iron Trade Association and for settlement in Glasgow." It is thought that by insisting on "settlement in Glasgow" the position of the Scotch market would be safeguarded, but that remains to be seen. It cannot be overlooked that the Scotch pig-iron warrant market is not an institution that exists for local interests alone. Its clientele now more than probably ever before is drawn from England, and if Scotch financiers continue to cultivate an erratic and at times ungenerous policy in their dealings with the market, such a resolution as that quoted will not

stand seriously in the way of the London Metal Exchange capturing a substantial portion of the business, for, as a well-known broker argues, where the warrants are there will the dealing be also. Though not quite relative to the question, it may be mentioned that on the Scotch Stock Exchanges also a strong feeling of dissatisfaction prevails because of the rates for loans charged by the banks. Even the best firms have to pay $\frac{1}{2}$ per cent. over the Bank discount rate, and that even when money is going almost a-begging in London. Those houses that can be forming connections in the South, and are in that way diverting another profitable but too lightly appreciated department of business.

National Electric Light Association.

—At the coming convention of this association, to be held at Kansas City on February 11, 12, 13 and 14, papers will be presented by the following: Prof. Elisha Thomson (subject not yet announced); Prof. Henry A. Rowland, who will base his paper upon an extended correspondence with members of the association, the object of which was to ascertain with what technical questions connected with the art of electric lighting they found the greatest difficulty. Thomas A. Edison will give an address by phonograph, and he has promised that the delivery will be a very perfect imitation of his voice and will be loud enough to be heard in all parts of the house. Frank J. Sprague will treat the subject "Electricity as Applied to Street Railways"; F. F. Sickles, "The History and Theory of the Steam Engine"; George H. Babcock, "The Economic Generation of Steam"; Myron D. Law, "Nine Years with the Arc Lamp"; C. A. Harber, "Line Insulation from the Standpoint of Practical Experience"; T. Carpenter Smith, "A Universal System of Central Station Accounts"; A. J. De Camp, "The Cost of the Products of Central Stations"; C. J. H. Woodbury, "Central Station Construction"; C. J. Field, "A Recent Edison Central Station and the Results Thus Far Obtained"; Henry W. Pope, "How Our Paths may be Paths of Peace"; C. C. Haskins, "Prodigality in Economy."

American trade opportunities in Brazil are said to be excellent, it only being needful to cater for that market by manufacturing, packing, &c., to suit the requirements of the country. Dr. Paula Desarta, editor of the Maranham Globe, himself an ardent admirer of the new Republic, says that within one year the United States of America will find that its export trade to Brazil has increased several million dollars, and that each year the increase will be more marked. With a dislike for monarchies and their institutions, the people of Brazil are only too eager to manifest their preference for a sister Republic. During the existence of a monarchy in Brazil several reasons existed which made the extension of trade with the United States a matter of great difficulty, chief of which was that the monarchical government naturally did all that was possible to divert trade to monarchical countries abroad instead of to a Republic, and the laws, to a certain extent, were shaped with that end in view. Now that disability as well as many others has been entirely removed, and the order of things will be exactly reversed. But the golden fruit of Brazil's trade is not going to drop into the pockets of the merchants of the United States unasked. A correspondent at Maranham says: "If only the merchants of North America could come to Brazil and see for themselves what wonderful opportunities for trade this remarkably rich country with its 14,000,000 of inhabitants has to offer, they would quickly become alive to the situation and take advantage of it."

Rolling-Mill Appliance.

In rolling-mill practice it is customary to weigh the articles operated on at various stages of their manufacture and also at the end of the finishing operation. This practice necessitates the employment of a large number of laborers to transfer the articles to and from the scales, especially when the articles to be weighed—such as slabs and plates—are large and cumbersome. The object of an invention recently patented by Henry Aiken, of Pittsburgh, Pa., is to provide means, such as rollers or casters, whereby the slabs, plates, &c., can be easily transferred from one mechanism to another of the plant, scales being arranged

mit the slabs or plates to pass over the scales. Any suitable construction or form of scales may be employed and they may be arranged singly or in pairs, as shown in Fig. 1, at any desired point in the plant.

The bars F attached to the platform of the scales and extending over the scale beam, as shown in Fig. 3, are provided in order to protect the scale beam and its support from injury. The scales are steadied while being raised and lowered by the guide rods G, which are attached to the scales and extend down through suitable openings in the floor plates. It is evident that various changes may be made in the arrangement without departing from the idea as above explained.

The Output of Iron Ore in England.—The total output of iron ore from the mines of the United Kingdom in 1888 was 14,590,713 tons, valued at £3,501,317, an increase of 150,000 tons on the figures for 1887 as regards quantity and an increase in value of £266,000. Twenty years ago the total production of the iron mines of Great Britain was a little over 10,000,000 tons annually, but ten years ago the output exceeded 18,000,000. In 1880 the maximum seems to have been reached, the annual output steadily declining until 1887, when the Government returns placed the total at 13,098,041 tons. As already noted, a revival in iron-mining occurred last year, and the returns for 1889 will

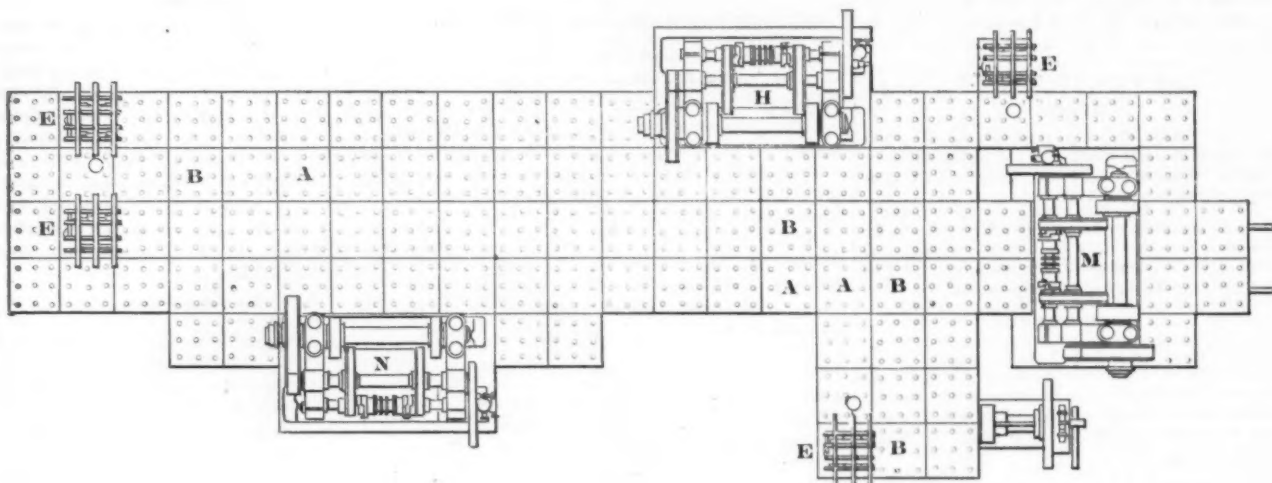


Fig. 1.—Plan View Improved Rolling-Mill Appliance.

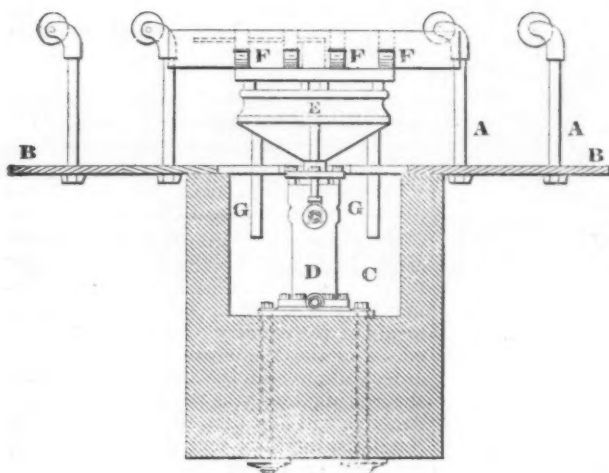


Fig. 2.

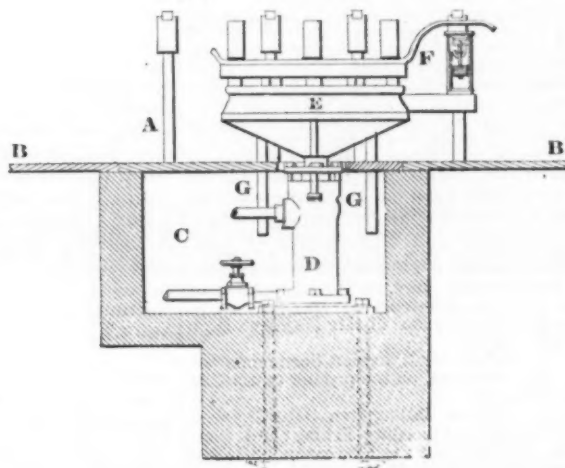


Fig. 3.

Sectional Views Showing Scales in Elevation.

in such relation to the rollers that the articles may be transferred to the platform of the scales by a movement of either the scales or rollers.

The rollers A are arranged on the floor-plates B of the mill in such relation to the various mechanisms H, N, M, &c., forming a part of the plant, that the slabs may be easily moved from one mechanism to another. At such places as it may be desirable to arrange the scales, pits, C, are formed below the level of the mill-floor, and in these pits are arranged hydraulic or other suitable lifts or elevators D, adapted to raise the scales E above the level of the rollers an amount sufficient to transfer the entire weight of the slabs or plates from the rollers to the platform of the scales and to lower the entire scales below said rollers or casters, so as to per-

For example, the scales may be arranged below the level of the rollers or casters and the floor plates adjacent to the scales may be arranged in a suitable lift or elevator, whereby the floor plates with their rollers or casters carrying the slabs or plates to be weighed, can be lowered until the slabs or plates rest upon the platform of the scales and then raised to normal position.

This appliance has been in use about two years, and its use has been found to very materially reduce the cost of output in a large steel plant. A number of plate manufacturers have adopted this scale; it has also been put in use weighing the material from the rolls, to the shears, in muck and slab mills, thereby saving the handling of pieces after shearing or the weighing of them separately.

show a still further expansion of the industry, but the figures will still be far behind those for 1880. The output of ironstone from mines working under the Coal Mines Regulation act was last year 8,635,032 tons; from pits regulated by the Metalliferous Mines acts, 2,937,253 tons, and from open workings 3,018,428 tons.

Much of the railroad legislation in the Dominion Parliament this year directly concerns the United States. An Ottawa special says: "The rapidity with which the Dominion and the United States are being linked together by bands of steel can be appreciated as it deserves after a careful study of the notices covering the railway business to be passed upon at the next session of the Dominion Parliament. There are numerous roads surveyed of

railways giving new connections between Central Canada and New York, Central Canada and Boston, Eastern Canada and the New England system generally, the maritime provinces and the Atlantic States, Manitoba and the Northwest, with Duluth and other cities. There are important extensions proposed to the American roads already tapping British territory, and connections between the British Columbia and California systems of road. Among the most noteworthy of the new schemes is a series of links intended soon to form a complete east and west trunk line from the Atlantic to the Pacific. The most important probably of the proposed New York roads is the Ottawa, Morrisburg and New York Railway. This road proposes to bridge the Ottawa at the capital and the St. Lawrence near Morrisburg. By the former it will connect with the Pontiac and Pacific and the Gatineau Valley roads, both now actually under construction, and both destined to tap the new east and west great Pacific line 60 miles or so north of Ottawa, and if events should so decide with the Canadian Pacific, giving all these roads a new and very direct cut to New York from Duluth via the South Shore, saving the long detour by way of Ogdensburg on the one side or Montreal on the other."

Chicago is reaping much benefit from the relocation of industries now in progress. The transfer of Eastern manufacturing establishments to the vicinity of that city is quite a familiar story, having been repeated so often. But a variation has recently occurred which promises to be of sufficient importance to be noticeable. Within the past six months at least three important enterprises located at points west of Chicago have removed their plants to its immediate vicinity, and now another large establishment in Iowa is completing arrangements with the same end in view, a site having already been secured. The advantages to be obtained are not only the transportation facilities derived from the numerous railroad systems radiating from Chicago, but the increasing importance of the city in forming a base of supplies. Labor is also plentiful and probably to be had at as low rates as anywhere else in Northern manufacturing centers. From being one of the dearest points of production Chicago is rapidly becoming one of the cheapest, and this fact is having its effect on manufacturers who find their operations hampered by the strict construction of the Interstate Commerce act, and are considering the advantages of other localities.

The Builders' Exchange, at Pittsburgh, has applied for a charter. A special committee is now at work upon it, and it will be advertised in a few days. The capital stock of the corporation is to be made \$5000, divided into 50 shares of \$100 each. The stock has nearly all been taken. The object in securing a charter is to enable the Exchange to do business as a corporation. Although there has been an organization for several years the exchange has had no legal existence. The annual dues will probably be raised from \$6 to \$25 per annum.

During the past fiscal year the gross debt of the Dominion increased \$3,208,221, bringing it up to \$287,722,062, while the net debt increased by \$2,998,683 to \$237,537,041. These figures indicate that the Conservatives now in power have piled up the public indebtedness faster than the Liberals, whose alleged pernicious methods in the past they profess to deprecate. The Conservatives, however, do not shrink from a comparison, but in self-vindication point with conscious pride to what they have accomplished,

particularly in building the Canadian Pacific Railway, "the splendid fruits of the opening of the Northwest and the capabilities of national growth thus created." Since 1878 the sum of \$51,700,000 has been expended in opening the great transcontinental highway. In other words, we are told that "more than one-half the total increase of the net debt of the Dominion in the last 11 years has arisen from expenditures in connection with the transcontinental line." Canadians are proud of their achievements, content to await the developments of future years in vindication of their seeming audacity in assuming pecuniary obligations of no ordinary magnitude.

Alleged Tariff Discrimination in Canada.

It has been charged that the present Canadian tariff discriminates against Great Britain in favor of the United States, and the Montreal *Gazette* endeavors to show that the statement is disproved by the facts. American manufacturers, we are told, are not able to undersell their British competitors in the Canadian market. The *Gazette* remarks at length, supporting its views by referring to the trade returns of the Dominion for the last fiscal year.

In the last year for which we have the details the value of dutiable goods imported from Great Britain, the editor says, was \$30,848,116, as against \$27,097,680 from the neighboring country, and in these totals are included practically every class of manufactured article brought into this country. It is true that the aggregate imports from the United States much exceed those from Great Britain, and as manufacturing industries develop in Canada the excess must gradually increase, for the simple reason that nearly one-half of all our purchases from the United States consist of raw materials not capable of production in the Dominion, and not exported from the mother country. If the mere aggregates of trade are dealt with, it is an easy matter to show that on the surface the tariff appears to operate in favor of the neighboring country, both because our imports thence are larger, and the average duty paid smaller, than in the case of trade with Great Britain; but, as we have said, this tendency is inevitable under the existing fiscal policy, and the more that policy fulfils its purpose the more marked will this disparity become.

To properly understand the operation of the tariff it is necessary to examine the details of our imports. The following statement of imports in 1888, for instance, will show how it comes that as Canada grows and prospers we buy more and more from the United States, and the average of duty paid becomes less and less:

Articles.	From United States.	From Great Britain.
Coal, anthracite.....	\$5,286,130	\$4,292
Logs.....	279,872	800
Walnut.....	258,250	.....
Raw furs.....	246,380	114,639
Raw hides.....	1,565,206	35,618
Raw silk.....	164,708	.....
Wool.....	543,004	369,962
Broom corn.....	125,609	.....
Hemp.....	272,135	772,790
Raw tobacco.....	1,464,880	.....
Raw cotton.....	3,110,522	2,091
Gutta percha.....	567,401	19,653
Steel rails.....	30,907	1,202,597
Pig iron.....	95,973	200,577
Tin plates.....	69,601	668,220
Settlers' effects.....	1,248,063	409,997
Coin and bullion.....	2,041,552	131,077
Total.....	\$17,370,182	\$3,932,213

All of the above articles enter free of duty; nearly all of them are the raw materials of our manufactures, and of neces-

sity must be purchased in the United States. Ten years ago our import of these raw materials was less than one-half as large as at the present time, and as home industries grow the import will expand to the advantage of Canada and without injury of our trade with Great Britain. Now, the way in which the duties on American imports are made to appear less than the duties on British imports is by including in the totals these raw materials which enter free, raw materials which England does not export, which Canada does not grow and which can be procured only from the United States. There is no discrimination against the mother country in this. If 1 yard of cotton cloth or 1 ton of iron is brought into the Dominion it pays precisely the same rate of duty whether purchased in Liverpool or in New York. Ten years ago, before the introduction of the national policy, the average rate of duty on imports from Great Britain was 16 per cent., and on imports from the United States it was only 8 per cent.; to-day the proportions are 22 per cent. and 14 per cent. respectively, so that even on the basis of comparison taken by the Liberal press, what is called the discrimination of the present tariff is less than that of the old one.

The United States War Department have ordered shipped to Watervliet arsenal at West Troy, N. Y., a welding machine built by the Thomson Electric Welding Company. The machine is to weld wire used in the manufacture of rifled cannon, and was thoroughly tested before being accepted. The Navy Department have ordered the appointment of a commission to visit Boston in February and examine and report upon the adaptability of the electric welding process to the welding of boiler-flues, &c., upon Government cruisers. A chain-welder for the Charlestown Navy Yard is also to be tested.

A Duluth dispatch states that Capt. Alex. McDougall and Capt. Thomas Wilson, of Cleveland, have gone to the Pacific Coast to select a site for building the "whale-shaped" boats for the Pacific Ocean. It is reported that the American Steel Barge Company have made a contract with a coal company for a large amount of coal carrying on the Pacific, and that this contract will necessitate the building of a number of boats.

Irving A. Scott, of the Union Iron Works, San Francisco, urges Secretary Tracy to have a clause put into some of the future appropriation acts, such as was inserted in one or two in former years, authorizing him to accept bids of Pacific Coast firms at a reasonable limit above those of Eastern ship-builders, in order to permit the former to compete with the latter with a fair chance of success. The difficulty the Westerners have always encountered in obtaining ship-building contracts arises, to a large degree, from the great cost of transportation of materials across the continent. In the case of the San Francisco the Cramps offered to build the vessels for \$70,000 less than the bid given by Mr. Scott, but in order to encourage the infant ship industry on the coast the contract was sent West.

Some of the Western daily newspapers show considerable excitement over a mysterious new process for the manufacture of steel. Charles Adams, of Pittsburgh, is spoken of as the inventor, the company being styled the Iron and Steel Improvement Company. It seems to be a direct process. The usual amount of revolutionizing is promised, but no details of the methods followed are given out.

The Deterioration of Electrical Conductors.

In an interesting communication to *La Lumière Electrique* M. Firmin Larroque gives an account of some of his observations on the deterioration of copper conductors by the long-continued passage of strong currents of electricity through them. His attention seems to have been first called to the question in 1884, when he examined the electrical and mechanical properties of some pieces of electric-lighting cables that had been in use for some years. One specimen—a portion of a cable which had conveyed electricity to a light-house lantern for a period of 20 years—gave very striking results. It was extremely brittle and broke in fragments under the hammer, while its fractured surface resembled in all particulars that of electrolytic copper. The current through this cable had not been in any way excessive, nor had it been subjected to any heavy mechanical straining. Similar though less marked results were obtained with other cables which had been in use for shorter spaces of time. The currents in all these cases were direct, but a portion of the secondary circuit of a small Runkorff coil, for many years employed in igniting the gas of a Lenoir gas engine, gave M. Larroque an opportunity of examining the effects produced by an alternating current. This coil had become very brittle, and broke up during the process of unwinding; its electrical resistance, moreover, had increased about 31 per cent. during the years it had been in use. M. Larroque then determined to make some systematic experiments on this subject.

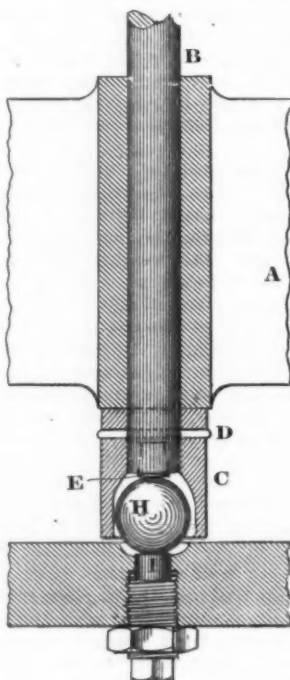
He endeavored in the first place to determine whether the long-continued passage of a powerful current of electricity caused any expansion of the wire, and secondly whether and in what degree it altered the elastic properties of the material. For each experiment nine pieces of copper ribbon 10 mm. broad and 0.3 mm. thick were provided, and for the second of the experiments each specimen was bent into a zigzag of 80 bends. One end of the zigzag was attached to a rigid support, and from the other a weight of 10 grams was hung. Some of the specimens were hard-drawn copper, and the others were made from the annealed metal. Through seven of the nine specimens a current, in some cases alternating, in the others direct, and ranging in different cases from 0.5 to 2 ampères, was passed, while the other two specimens, one of which was hard-drawn and the other annealed, were kept as standards, so as to eliminate any changes arising from causes unconnected with the passage of an electric current. Should the elasticity of the specimens be altered by the current, the position of the 10-gram weight would of course vary correspondingly, and means were taken for the accurate estimation of such changes. During the first nine months of the four years over which the experiments have been prolonged the observations showed a want of uniformity, but since then have been very regular, and the results now published show that the elastic properties of the wires have been very considerably changed. This variation takes place the more rapidly with strong than with weak currents, and with alternating than with direct.

Although the new cruiser *Baltimore* was formally accepted by Captain Schley, acting for the Secretary of the Navy, last week, the result of the computations of the horse-power developed by the engines of the cruiser during her last official trial was not reported until Monday last, when the Board met at Cramp's office and signed the report, which will be forwarded

to Secretary Tracy. It shows that during the four hours' run the engines averaged 10,064 horse-power, being 1064 in excess of the contract requirements. This is about 300 less than has been announced in dispatches from Philadelphia, but it is enough to give Cramp & Sons, her builders, \$106,400 premium. The report lacks the signature of Chief Engineer John F. Bingham, a member of the trial board, who was ordered to the Alliance at the Norfolk Navy Yard before the report was finished. It will not be given out for publication in full until his signature is affixed.

Step Bearing.

The difficulty of making a thoroughly efficient step bearing, and keeping it properly lubricated is well known. The annexed diagram illustrates a device which has recently been brought out in Europe. The bearing A carries a shaft B, to the end of which is secured by means of a key, D, or in any other suitable manner, a socket or cup, C, in such a manner that the socket or cup partakes of the rotation of



Step Bearing.

the shaft B. In the outer end of the shaft A is arranged a removable studor pivot, E. The inside of the socket C is shaped as shown in the drawing, in order that a sphere, H, may be arranged to bear against the stud or pivot E. The inner diameter of the socket is somewhat larger than the diameter of the sphere, and the depth of the cavity in the socket should be less than the diameter of the sphere, so that the sphere projects beyond the socket. The shaft B is thus supported by means of the stud or pivot E, and the sphere H, which in turn is supported by a bolt, I, arranged in a crosspiece. The bolt is screwed into the crosspiece and is provided with a jam-nut, so that the same can be removed at pleasure. The friction between the stud or pivot E, the bolt I, and the sphere is here a rolling friction, because the centre of the sphere is not situated in the centre line of the shaft B and the bolt I, but a little to one side in proportion to the same. The stud or pivot E of the shaft B reposes thus only against one point of the sphere H.

If the surrounding cup or socket C did not exist the result would be that the sphere disposed obliquely to the center line of the shaft by means of the rotation of the shaft would be rolled further from

the center line and thus removed from its place. Besides this purpose, the cup or socket serves also to rotate the sphere, when the same by the rotation of the shaft is brought outward so far that it touches the inner side of the cup or socket. The sphere H is thus slightly pressed against the inner side of the cup or socket C during the time that the shaft stud or pivot E tends to rotate or roll the sphere. As the machine in which the stud-bearing is placed always shakes, the sphere will by this reason rotate a little, in an irregular manner and in various directions, and roll between the stud and pivots, so that their points of contact with the stud always vary. Vibrations of the machine also prevent the sphere from resting in such a position that its center is always situated in the center line of the shaft. If, as shown in the drawing, the edge of the cup is bent or directed slightly inward, a quantity of water or oil can be held against the inner side of the cup when the shaft rotates quickly, and that contributes to diminish the friction between the sphere and the cup, and to lubricate the surface of the sphere.

Brick-Making in the United States.

—Some idea of the magnitude of the brick-making industry in the United States can be gained from the following table, which shows the number of bricks used in 12 cities during the year 1888, the total of which is 2,730,000,000. These figures are, of course, far from complete:

New York City.....	1,000,000,000
Chicago.....	440,000,000
Philadelphia.....	300,000,000
Boston.....	150,000,000
St. Louis.....	200,000,000
Cincinnati.....	100,000,000
Washington.....	125,000,000
Cleveland.....	84,000,000
Pittsburgh.....	80,000,000
Omaha.....	80,000,000
New Orleans.....	36,000,000
Indianapolis.....	35,000,000

The capital invested in the operation of this business is immense. The 300 delegates to the National Brick Manufacturers' Association, who met in Philadelphia several days ago, represented a capital of over \$150,000,000, which is but about half of the total sum used in the United States in carrying on this great business. Having visited and studied the modern brick-factories of England, Holland, Belgium, France and Germany, the authority for the above figures says that "in all the countries, ancient and modern, there is none in which the business of brick-making is carried on so extensively, and on the whole so satisfactorily and profitably, as it is in the United States."

Evidence of the prosperity of the Northwest is seen in the marvelous prosperity of Portland, Ore., whose manufactures have increased 50 per cent. since 1888, and now amount to \$20,000,000 annually; whose merchandise trade is \$63,000,000 per year, an increase of \$7,000,000 over 1888; whose real estate business has doubled in a year and now amounts to \$14,000,000; which has expended \$5,000,000 in new buildings in 1889, against \$3,500,000 in 1888, and whose bank clearances amount to over \$100,000,000 per year. As an evidence of the interior activity of business, note that there are three cities in Washington whose real estate business in 1889 equaled or exceeded Portland's, that of Spokane Falls exceeding \$18,000,000 for the year. The population of Portland numbers 64,657.

Among the decisions announced by J. Johnson, Commissioner of Customs at Ottawa, Canada, we note that the duty on aluminum bronze is 30 per cent., and that on wood snow shovels is placed at 25 per cent. ad valorem.

THE WEEK.

The Census Bureau will endeavor to do all that is practicable in carrying out the mandate of Congress to obtain statistics of the recorded indebtedness of the country. The work will have to be done by a corps of special agents, and there will be about 325 of them appointed, at a salary of about \$3 per day. The work in the State of New York will be done by 31 of these agents. They will take from the official records the facts regarding each mortgage recorded during the ten years from 1880 to 1889. These statistics will be classified, as far as possible, so that they may be intelligently studied. The agricultural lands will be separated from the town lots, the rate of interest will be ascertained, and private corporations will be separated from individuals. The work is in the charge of Mr. Holmes, a Western Massachusetts man, who has given it attention in connection with the Massachusetts census. Special bills being introduced in Congress for additional census legislation are wholly uncalled for.

The St. Paul Chamber of Commerce asks for a popular vote on the question of municipal union with Minneapolis. The "twin" cities have grown with marvelous rapidity.

The president of the New England Shoe and Leather Association says that part of the country seems destined to remain the center of the shoe and leather trade for all time. Boston shipped by sea and rail last year 3,400,000 cases of boots and shoes.

A sensation in Liverpool, England, was caused by a report which apparently has some foundation that the Atlantic steamship lines intend to land at Holyhead instead of Liverpool next summer. This would avoid Queenstown, and the mail would go direct from Holyhead to London, thereby saving eight hours. Holyhead has the advantage of having no bar and is available in all weathers. The only element of danger in rough weather would be the Platter rocks, which could be removed at a cost of a million sterling. Naturally this proposition meets with strong opposition in Liverpool. Milford Haven, which was under similar discussion, has been dropped on account of its tortuous channel. An agent of a great ocean line admitted that this movement was under consideration, and said that a slight alteration in the harbor of Holyhead would enable steamships to lie alongside the wharves, thus avoiding transfer by tugs. He thought the plan would probably be adopted.

The most phenomenal yield of corn ever produced in America has been awarded a prize of \$1000 for the largest crop of shelled corn grown on 1 acre in 1889. The crop was within a fraction of 255 bushels, green weight, shrunk to 239 bushels when kiln dried, and when chemically dried contained 217 bushels. This crop was grown by Z. J. Drake, of Marlboro County, S. C. It is nearly twice as large as the greatest authenticated crop ever before reported. The \$500 awarded for the largest yield of wheat last year goes to Henry F. Burton, of Salt Lake City, Utah, for a yield of 80 bushels on 1 acre.

The Italian Chamber of Commerce of this city asks Congress to put Mediterranean fruit on the free list, mainly on the ground that the crops grown in Florida and California mature at a different season and therefore are not in competition.

The Silk Association of America report that manufactured silks were imported at New York last year to the value of \$33,897,000, an increase of nearly \$2,000,000 compared with 1888, and that the imports of raw silk at New York and

the Pacific coast amounted to 42,617 bales, valued at \$23,427,000, as against 38,856 bales in the preceding year.

Chauncey M. Depew asks the Legislature of this State to appropriate \$10,000,000 in aid of the World's Fair, and the heads of municipal departments in this city concur.

The receipts of sugar at San Francisco for the entire year 1889 included 112,009 tons from the Sandwich Islands, 28,511 tons from the Philippine Islands, 807 tons from Java, 268 tons from China, and 1500 tons from Central America; total, 143,155 tons, against 115,220 tons in 1888.

Icebergs are reported off the North Atlantic Coast two months in advance of the usual break-up in March. Strawberries in the South are likewise two months ahead of time, *shad ditto*.

The Park Board decide to erect another bridge over the Harlem River at 155th street.

Two bills are under consideration by Congress to prevent the adulteration of food.

The banker Henry Clews says there is dangerous monetary expansion in England. He remarks: "At the moment, London is the weak spot in the financial world, speculation in new enterprises there for the last two years having gone on at a rapid and even reckless rate. The aggregate amounts of capital subscribed to loans and companies of all kinds in Great Britain during the last few years have been as follows: 1884, \$545,000,000; 1885, \$390,000,000; 1886, \$505,000,000; 1887, \$480,000,000; 1888, \$800,700,000; 1889, \$900,000,000. Such expansion as that of the last two years is out of all proportion to the growth of legitimate trade. Reaction, of course, must follow. It does not appear to be near at hand just now, and there are influences at work which will tend to counteract and delay its force; still these are facts not to be overlooked."

Two guys of the new suspension bridge across the Niagara River snapped during the gale last week and for a time the structure swayed violently, but it fortunately survived the blast.

The State Department is getting much interesting information regarding the rebates allowed by the German Government on goods manufactured in Germany for export abroad. The representative of at least one German house has admitted that on crude fabrics imported into Germany to be finished the German Government allows a rebate on their exportation equal to the entire amount of the import duty. It is a question whether this attempt to benefit German exporters by relieving them of the burdens ordinarily incident to local trade will be countenanced by our Government.

The authorities at Washington being desirous of placing the New York emigrant landing exclusively within the federal jurisdiction, it is proposed to vacate Castle Garden and transfer the whole establishment to Ellis Island, which is now used as a naval magazine. The island is a mile southwest of Castle Garden and lies almost directly north of Bedlow's Island. It is much nearer than Castle Garden to the wharves of the Pennsylvania Railroad Company and other connecting systems. The island is about as large as Battery Park, and it is claimed that there is a channel on the northerly side deep enough to permit the landing of big steamships.

A bill to incorporate the National Industrial Institute has been introduced at Washington, with the object of preparing teachers for work in the common schools throughout the country.

In the Massachusetts Legislature an order has been adopted requiring cities and

towns to place upon every schoolhouse a national flag. The doughty "Ben" Butler manufactures bunting on a large scale and is heartily in sympathy with this movement.

Ireland is in a tranquil condition. An awakened interest is being manifested on all sides in the industrial development of the country. Boycotting and agrarian outrages have almost ceased. A better day has dawned on the Emerald Isle. It is probable, therefore, that migration to America will in the year 1890 be in a reduced volume.

United States Consul Bird, at Laguayra, Venezuela, has reported to the State Department that there are now three foreign steamship lines running steamers between Laguayra and New York under large subsidies from their respective Governments. He says the American steamers, which also run regularly between the ports named, and which after years of energy and industry and without aid from the United States built up a good business, will now have a hard struggle against the rates dictated by their rich and powerful competitors.

Two colonies of Icelanders in Manitoba make excellent farmers and are good stock raisers.

The commerce of the Amazon is nominally carried on under the Brazilian flag. Foreigners are not allowed by law to own steamers or sailing vessels employed in inland navigation; and hence it is necessary for the English capitalists who control the carrying trade of the river to assign their interests to Brazilians. There are 40 steamers owned by an English line, which receives a large mail subsidy from the Brazilian Government for plying between various ports and villages on the main tributaries; and in return for this financial support it is well satisfied to fly the national flag. Another company have eight steamers under similar conditions, and there are as many as a dozen more on the river and its tributaries which sail under the Brazilian flag. These 60 steamers are gradually opening the Amazon Valley to commerce. Only the smaller vessels are now running beyond Manaus at the junction of the Negro, but next year the largest English vessels will make regular trips to Yquitas, a distance of 3750 miles from the coast. This river trade is almost completely in the hands of the Portuguese merchants and the mercantile houses represented at Para, a city of 50,000 inhabitants.

Not for 50 years has the Connecticut River remained open as late as now.

The coal miners in the Connellsville region are about to establish a technical school, with funds raised by themselves.

The Union Water Company, of Elizabeth, N. J., have been formed—capital, \$100,000—to introduce water in that city.

The Chesapeake and Ohio Canal is a troublesome competitor with the Baltimore and Ohio Railroad, who are trying to put it in the hands of a receiver. The abolishment of the canal will remove the most important public work in Maryland's history. The canal was projected by George Washington. The first dirt was dug by President John Quincy Adams in the presence of the distinguished men of that day. In digging the first spadeful he hit a rock. He tried again, but made no impression. Then, throwing off his coat he went at it in his shirt sleeves, while the crowds cheered tumultuously. The building of the canal was a heroic record of financial failures and misfortunes, but it was finally completed. It runs from Georgetown to Cumberland, a distance of more than 240 miles, following for the most part the course of the Potomac. It

crosses rivers, goes through mountains and runs over some of the finest masonry work in this country.

The new Swedish law taxing commercial travelers provides that any foreigner or Swedish subject residing abroad, who has not paid taxes for the current year to the Swedish Government, who travels about the country either on his own account or that of another, to sell foreign wares for future delivery, whether he takes samples with him or not, must on entering the country send a written declaration to the nearest collector of taxes, stating how long he intends to remain, and enclosing a sum of 100 kroner (£5.-11/14d.) for each month or part of a month which he intends to remain, for the privilege of carrying on his business. No traveler is to be allowed to effect sales of foreign wares until he has satisfied the police that he has paid the tax. A breach of the law is punishable by fine not exceeding five times the amount of the tax. The law does not apply to Norwegians dealing in Norwegian products.

The movement in the National Board of Trade to unite all the commercial organizations of the country in one great body meets with general favor. The committee engaged in promoting this object has made a thorough enumeration of all the commercial exchanges and similar organizations in the country and finds 526 of them with a membership of 96,192. Of these 278 or more than half have been organized within the present decade or since 1880. The committee thinks that these local bodies or at least a large number of them, do not yet fully appreciate the importance of a permanent central and national organization, or how much more they can accomplish when associated together than when operating singly. The Executive Council meets in Washington early next month.

The Dominion Government will ask the Canadian Parliament at their coming session to vote \$4,000,000 toward the Hudson Bay Railway scheme. Most sensible people supposed that this scheme had been wholly abandoned as impracticable.

Governor Lowry, of Mississippi, in his biennial message gives a roseate view of the progress of industries in that State. Values of every description have appreciated, and it is especially noted that the people were never more contented than at present. Every vocation having for its object the advancement and development of our material interests receives unstinted encouragement, thus creating in the conduct of all enterprises hope and inspiration for the future. When it is remembered that the valuation of real and personal property in the State in 1882 was \$116,000,936, and that to-day it is in round numbers, \$158,000,000—an increase of over \$41,000,000—it will be readily comprehended that the State combines advantages that will continue to grow and develop until multiplied millions will be added to our wealth. Cotton manufacturing has increased 40 per cent. within the last decade, as shown by the number of mills, and Governor Lowry is of the opinion that Mississippi will rise to the first rank in this department of enterprise. The growth of other industries has been equally rapid.

The Henning Gravity Tunnel Company propose to build a tunnel from Broome street, New York, to a point near Broadway, Brooklyn. There is to be a double-track railroad in the tunnel, which is to be operated by the East River Railroad Company just organized by the election of Benjamin S. Henning as president and George S. Morrison as consulting engineer. The plan is to construct a tunnel on an incline from each end, the descent to be about 15°. When a car is started at either

end gravity will carry it on the down grade, and when it reaches the lowest point it is expected that it will have enough momentum to carry it part of the way up the incline to a point where the car will grip a cable, by which it will be hauled to the top. The tunnel is to be between 2000 and 3000 feet long, and it is calculated that the trip through it can be made in a minute. The estimated cost is \$3,000,000. Mr. Henning advises building at least one tunnel like those made under the Thames at London before essaying another bridge.

Is there trouble with or within the Spanish Commercial Union, organized last spring with much flourish of trumpets, and which quite recently partook of a sumptuous banquet ostensibly in honor of the Pan-American delegates? We now learn that the president of the society, Mr. Ceballos, a merchant of good position and much influence, has resigned, also that many of its best men failed to grace the table with their presence on the occasion last referred to. It is unfortunate that an organization promising so well and capable of contributing so much to the promotion of trade interests between the United States and neighboring republics should so soon be crippled by the disaffection of any of its members. If there have been mistakes they should be corrected; if wrongs done they should be honorably atoned for.

Samuel Gompers, president of the American Federation of Labor, has issued an appeal to the constituent unions of the Federation to make contributions in aid of a fund for the agitation of the eight-hour movement between now and May 1.

The "Reading terminal bill" has been signed by the Mayor of Philadelphia, and if the concessions are accepted by the railroad it will have the opportunity long desired of building across the city into certain available suburbs.

The Spanish Government has of late years displayed great enterprise in the establishment of works for the building of war-ships and cannon. At Trubia the Government has erected an immense concern for the production of heavy guns, and is now about to put in Siemens furnaces for the casting of high-grade steel for new ordnance. Among the guns lately turned out at Trubia are four which form part of the armament of the new Spanish steel cruiser Palayo. The guns are built on the Hontoria system. The penetrating power at short range is 32 inches of wrought iron. Length of gun about 40 feet.

Two Pennsylvania engineers, John M. Goodwin and T. P. Roberts, have commenced the survey of the route for the proposed ship canal between the Shenango Valley and Erie, on the lakes. They act under the direction of the Pennsylvania Ship Canal Commission.

One of the most interesting features of the Samoan treaty, now made public, is the article which relates to the revenues. On spirits, wine, tobacco, cigars, fire-arms and gunpowder heavy duties are levied, and upon all other articles of merchandise an import duty of 2 per cent. only is imposed. An export duty of 2½ per cent. is levied on copper, of 2 per cent. on coffee and 1½ per cent. on cotton.

The Mexican Government has conceded important privileges to the Ward line of American steamships from New York, permitting them to engage in the coasting trade in Mexican waters. In return the company engage to carry free all Mexican postal matter to and from all ports at home or abroad and to follow their schedule of sailing so far as is possible.

Taking Down an Electric-Light Pole.

For several months past New York City has been endeavoring through its authorities to do away with all electric conductors stretched upon poles, and to compel the placing of them in so-called subways in the streets. The city in carrying out this work has frequently been called upon to take down a pole so located that the placing of it in a horizontal position called for nice judgment and well-adapted rope connections. How these poles are taken down when they must be felled in exactly the right position, or in other words when the top of the pole must not vary 4 feet from the line it stood in, are questions which of course interest every one. The method of taking down a pole therefore which stood between the elevated structure in Church street, and from which structure the house-line of the building was not more than 7 feet away, presents points of general interest. After this pole had been relieved of its cross-bars and all wires connected with it, it was stayed at the bottom with four ropes placed at right angles to each other and attached just above the cut. These ropes were intended to prevent any movement or jump of the butt of the pole. It was then provided with three ropes about midway between the top and the bottom, one of which was so arranged as to guide the descent of the pole, the other to prevent the pole falling in the opposite direction and the third to insure the pole falling in a line with the elevated road.

The cutting of the pole at the base, evidently done by a backwoodman, since he handled his axe with a degree of precision not found in the city, was begun on that side toward which it was desired to fell the pole. After he had cut beyond the center of the pole he began work on the opposite side. As he approached the dividing line between his cuts all ropes were tightened. Thus the butt of the pole by its four ropes was prevented from any jumping, and also the top of the pole was prevented from striking the building, where it might have done some damage, by the rope connected with the elevated railroad, and it was also prevented from falling too fast in either direction by ropes which extended parallel with the elevated structure. After he had cut about half way through this side of the butt of the pole, the rope was hauled on that side to which it was desired the pole should lean, and as the pole gave way to this pressure the rope upon the opposite side was played out while that toward the elevated structure was so guided that the pole just missed the cross-ties; and in this way was lowered to the street without any hitch whatever and without its deviating 12 inches from the line it should have followed. The system of taking down poles as developed here in New York shows that by the simplest means any pole can be felled and carried down within the closest limits; in other words, as was the case with the pole above mentioned, it can be taken down by an elevated structure projecting over the sidewalk and between the buildings on the line of the sidewalk, and yet can be done easily and gently and without in any way interfering, beyond a few minutes, with travel on the elevated road or on the sidewalk.

We have received from the Illinois Steel Company, of Chicago, a piece of the new 75-pound rail section which is now the standard adopted by the Illinois Central Railroad. It is handsomely nickel-plated, suitably engraved, and forms a neat paper-weight. The section is admirably proportioned in head, web and base, and is in every respect worthy of adoption as a standard rail.

MANUFACTURING.

Iron and Steel.

The puddling department of the Lower Union Mills of Carnegie, Phipps & Co., Limited, at Pittsburgh, was put in operation on single turn on Thursday, the 16th inst. This plant has been closed down for three weeks for repairs and stock-taking. The men objected to the character of the iron they were obliged to use.

A large fly-wheel in the plate mill of the plant of the Laughlin Iron Company, at Martin's Ferry, Ohio, exploded on Tuesday, the 14th inst., a pair of tongs having fallen between the rolls. The mill was damaged to the extent of about \$1000. There was but little interruption of operations.

The Crescent Steel Company, of Pittsburgh, have recently added to their plant an 18-inch plate mill. The mill will be used for rolling down slabs and finishing them off in thin sheets. Other extensions and improvements are contemplated by the firm in the near future.

Henry and George Wick, the well-known capitalists and iron manufacturers, of Youngstown, Ohio, have under consideration the question of erecting a blast furnace at Toledo, Ohio, next spring. No conclusion has been arrived at as yet.

The Laughlin and Junction Steel Company, of Mingo Junction, Ohio, recently declared a 2 per cent. dividend on the earnings of the past year.

At Pittsburgh last week an amended bill was filed in the United States Circuit Court by Edward M. Parrott, of New York, Receiver of the Cameron Iron and Coal Company, against the Rochester and Pittsburgh Coal and Iron Company, the Cameron Iron and Coal Company and Sheriff Kriner, of Cameron county. The bill is to restrain the sheriff from selling property of the Cameron Iron and Coal Company levied upon by the Rochester and Pittsburgh Company. It is claimed that the property levied upon is covered by a mortgage for \$1,000,000 held by the Central Trust Company. The judgment in the sheriff's hands is for \$14,500.

Cartwright, McCurdy & Co., proprietors of the Enterprise Iron Works, at Youngstown, Ohio, have purchased the rolling mill of the Pomeroy Iron Company, at Pomeroy, Ohio, which has a capacity of 80 tons of finished iron per day and gives employment to about 250 men when in operation. The plant has been idle for the past year, having been last operated by Edwin Bell, Samuel Atkins and H. S. Adbert, of Youngstown. Myron C. Wick, of the firm that has purchased the plant, states that it has not yet been decided whether they would repair the plant and put it in operation or remove it to Youngstown.

Work was commenced last week on the construction of another welding furnace at the plant of the Duquesne Tube Works Company, located at Duquesne, Pa. The company have one furnace at work manufacturing steel boiler tubes, and though running double time and full capacity, are unable to keep up with their orders. About 300 men are employed at this plant.

The nail factory of the E. & G. Brooke Iron Company, Limited, at Birdsboro, Pa., which has been idle for some time owing to a difference with the nailers in regard to wages, resumed operations last week.

An accident occurred at one of the South Chicago blast furnaces of the Illinois Steel Company on the 17th inst., which resulted in the death of one man, the serious injury of four others and painful wounds for several more. It was the result

of attempts to dislodge a scaffold in the stack. The damage to the furnace was comparatively slight.

The Calumet Iron and Steel Company, of Chicago, are introducing some changes in their rolling mill plant to secure greater efficiency. New puddling furnaces are being erected and old ones are being altered with a view to utilizing waste heat in firing overhead boilers.

The Alex Laughlin Company are now erecting a regenerative gas furnace, with working hearth 7 x 16 feet, for the Greenfield Iron and Nail Company, Greenfield, Ind. This furnace will not have any gas regenerators, but will only regenerate the air, as the fuel used will be natural gas exclusively. It is claimed that by the use of this type of furnace it is possible to heat iron or steel with a much less pressure of gas than in the old-style furnace; at the same time quite a saving is claimed in the loss by oxidation, owing to the fact that nothing but hot air is used to produce combustion, while all the air in the old-style furnace enters at natural temperature.

The Cape Ann Drop Forge Works, recently incorporated under Massachusetts laws, have the following officers: W. N. Fisher, president; N. H. Phillips, vice-president; Geo. R. Bradford, treasurer, and Geo. D. Loud, secretary and agent, with offices at Mason Building, Kilby street, Boston. Mr. Loud, the general manager of the works, is well known to the trade as the owner of the Loud patents on pumps and round edge tackle blocks. The plant of the new concern is being erected at Gloucester, Mass., and will consist of a main building 150 x 40 feet and an annex 48 x 50 feet. A side track of the Boston and Maine Railroad connects the buildings with the main line. They expect to be ready to fill orders April 1.

At the annual meeting of the stockholders of the Ellis & Lessig Steel and Iron Company, Limited, of Pottstown, Pa., held last week, George B. Lessig was elected president, William S. Ellis treasurer and J. B. Lessig, secretary. The company have advanced the wages of the nailers about 16 per cent. and of the men in the nail plate mill about 10 per cent., to date from January 1.

The Springfield Iron Company, Springfield, Ill., have added to their plant a new 12-inch guide mill, equipped with a Siemens heating furnace, 20 x 8 feet in the hearth. This mill made last month 807 tons of finished iron. This makes the fifth train of rolls this company have running double turn on bar iron and splices.

Montgomery Furnace, at Port Kennedy, Montgomery County, Pa., is now being built up from 50 feet to 65 feet in height, and the plant is being improved by the erection of a new vertical blowing engine and three fire-brick stoves. The furnace is expected to be in blast again in April.

It is reported that Secaucus Furnace, at Secaucus, N. J., is being prepared to go into blast.

The large anthracite blast furnace at Temple, Berks County, Pa., which has been idle for a number of years, is to be put into blast at once. George F. Baer is president of the company which will operate the furnace.

The two furnaces of the Onondaga Iron Company, at Geddes, near Syracuse, N. Y., have been leased for five years by Mr. F. B. Baird and others, who intend to start them at once.

The Oregon Iron and Steel Company, who have been repairing a flaw in the in-wall of their furnace at Oswego, Ore., expect to have the stack in blast again by the 1st of February.

Machinery.

W. B. Pollock & Co., proprietors of the Enterprise Boiler Works, at Youngstown, Ohio, have decided to erect two additions to their plant in February. One will be 55 by 60 feet and the other 60 by 60 feet.

The Pittsburgh Scale Company, of Pittsburgh, recently erected in the steel department of the Riverside Iron Works, at Wheeling, W. Va., one of their improved four-beam furnace charging scales.

We are advised by the Niles Tool Works, of Hamilton, Ohio, that the report that they were contemplating the removal of their works to the South is without foundation.

The Enterprise Boiler Company, of Youngstown, Ohio, have a contract to place blast-pipe through the puddle mill of the Wheatland Iron Company, at Wheatland, Pa., and also to build a 60-foot stack for the boilers. The firm are at work on the contract, and expect to begin putting the pipe in place about the 28th inst. They report plenty of orders on hand and a very encouraging outlook.

The Acme Machinery Company, of Cleveland, Ohio, report that they have several orders on hand at present for export to South America and England. They are running full-handed and overtime, and are extremely busy building the Acme Bolt Cutters.

The Niagara Stamping and Tool Company, of Buffalo, N. Y., have just issued a new catalogue devoted to tinners' tools. This describes fully the various tools used in the manipulation of thin sheet metal and gives illustrations and prices of each.

The Chautauqua Lake Ice Company, of Pittsburgh, have purchased a piece of property in that city 50 x 100 feet, on which an artificial-ice plant is to be erected at a cost of \$150,000. The contract was let last week, and it is to be completed and ready for operation on May 1 next.

From the Capitol Mfg. Company, of Chicago, Ill., we have received their 1890 catalogue. This describes and very completely illustrates the Adams Automatic Bolt-Threading and Nut-Tapping Machines, several of which we have made mention of in former issues of *The Iron Age*.

Hardware.

A report has been current in the daily papers to the effect that the Sheldon Axle Company, Wilkesbarre, Pa., had been purchased by English capitalists, but we are advised that this rumor, as so many others of similar effect, is entirely without foundation.

Erie Specialty Mfg. Co., Erie, Pa., have enlarged their works and added several new special machines to enable them to meet the demand for their goods promptly and are now running their works to their full capacity. Although their works were only started a year ago this month we are advised that their trade last year was very flattering and that this year they have already booked many orders. Their sales have extended into every section of the United States and Canada, while the company have also a large and increasing export trade to England, South America, Mexico and the Australian colonies.

The Clauss Shear Works, at Fremont, Ohio, were burned 17th inst. Loss, \$50,000; insurance, \$41,000. They will rebuild at once.

A part of the works of the Walpole Emery Mills, South Walpole, Mass., was destroyed by fire last week, but we are advised that their enormous warehouse was in no way damaged, but is in perfect running order and contains a full assortment of manufactured emery sufficient to fill all orders promptly. Immediate steps

will be taken to rebuild at once, and it is stated that long before their present large stock is exhausted they will be in full operation again.

Miscellaneous.

Among recently-authorized corporations in Illinois are the following: Lakeside Nail Company, at Chicago, to manufacture iron and steel products; capital stock, \$40,000; incorporators, W. Dyer, S. C. Gibbs and A. A. Mason. Munger-Colton Mfg. Company, at Chicago, to manufacture hardware specialties; capital stock, \$20,000; incorporators, B. L. Munger, C. L. Munger, G. A. Colton. Car Track Supply Company, at Chicago, to manufacture the Hubbard Self-Oiling Car Journals; capital stock, \$200,000; incorporators, W. S. Burling, J. H. Campbell and William Taylor. American Electric Motor Company, at Chicago, to manufacture and sell electric motor apparatus for street cars, &c.; capital stock, \$1,000,000; incorporators, R. G. Geiser, J. W. Adams and Louis M. Hopkins. Peoria Metal Spinning Company, at Peoria, to deal in railway signals and to stamp and die drawings upon metals; capital stock, \$50,000; incorporators, C. W. Robinson, J. C. Babb and J. H. Bevington.

The new works of the Piqua Rolling Mill Company, at Piqua, Ohio, are now well under way in all departments and turning out a fine grade of iron and steel sheets. The fuel used is natural gas exclusively, which has proved a great success now that the men have become accustomed to the process. The products of this mill are taken exclusively by the Cincinnati Corrugating Company and are used by them in their roofing trade. This has been found to be an advantageous arrangement for both concerns, as the market for the rolling mill products is assured, while it also enables the corrugating company to fill their requirements at the shortest notice, to feel assured of the quality of the metal handled and its uniformity.

We have received from the Garlock Packing Company, of Elmira, N. Y., an illustrated circular describing their elastic ring, sectional and spiral packings, for all of which decided advantages are claimed over the old and common forms. The elastic ring packing is made in rings to perfectly fit the rod and box. It is made in any size from $\frac{1}{4}$ inch to 30 inches in diameter. The sectional ring packing is especially adapted for rods out of line, cut rods, flat bottom stuffing boxes, locomotive works and other cases which present decided difficulties. The metallic packing is automatic, the rings being set to their place by pressure from the cylinder, assisted by springs, the arrangement being such as to make friction very slight.

The increase in the business of the Page Belting Company, of Concord, N. H., during the past year was larger than at any previous period in their history. The growth was confined not to this country alone, but extended into foreign lands, especially Japan. During the year they put on the market several specialties, particularly the Acme link belts and Eureka dynamo belts. The former, owing to its method of construction, which insures a solid contact of the belt with the pulley, has already been well received by users. Of the Eureka belt it is stated that it particularly fills the wants of electricians and engineers, since it combines the utmost possible traction, the least possible stretch and perfect straightness of running.

The National Pulley Covering Company, of Baltimore, have recently received their second order for their patent friction covering for pulleys from Mason & Hamlin, manufacturers of pianos, Boston, and the

Kidd Steel Wire Company, of Harnarville, Pa., both of whom in placing their order informed the company that the order was given through the satisfactory results obtained from its use.

New Compound Locomotive.

On the London and Northwestern Railway F. W. Webb has brought out a new type of compound. The low-pressure cylinder reverses itself automatically, so that Joy's gear is only fitted to the two high-pressure cylinders. The valve of the low-pressure cylinder is actuated by a single loose eccentric in the old steamboat way, the high-pressure cylinder revolving the axle inside the eccentric either way until the snugs come in contact. We may add, says the *Engineer*, that the same principle has been applied independently by an old pupil of the late Mr. Stroudley to triple-expansion marine engines. Only the first two cylinders are fitted with the link motion. The third engine has a loose eccentric. Engines indicating 1600 horse-power have been thus fitted, with the best results. Mr. Webb has lately been trying how much continuous work can be got out of a compound engine, and he has run the Teutonic continuously, without letting steam down, between London and Carlisle, until a distance of 1200 miles had been attained, the average running speed being over 48 miles an hour. This, we need scarcely add, is an unprecedented performance, speaking volumes for the excellence of Mr. Webb's workmanship. The work was done with a three-cylinder compound engine, having two high-pressure cylinders 14 inches diameter, 24 inches stroke, and one low-pressure cylinder 30 inches diameter, 24 inches stroke. Diameter of central and trailing wheels, 7 feet; diameter of boiler outside of middle ring, 4 feet 3 inches; length of barrel, 11 feet; thickness of plate, $\frac{1}{2}$ inch; 225 tubes, outside diameter, $1\frac{1}{2}$ inches; boiler pressure, 175 pounds per square inch. Heating surface: tubes, 1242.4 square feet; fire-box, 159.1 square feet; total, 1405.5 square feet. Fire-grate area, 20.5 square feet. Weight of engine in working order, 45 tons 10 cwt.

On December 3 this engine started on a trip of 1200 miles. This journey was accomplished with one steam raising without dropping the fire. The engine was actually in motion 24 hours 57 minutes, which gives a speed of 48.09 miles per hour. The engine was away from the steam shed 47 hours 53 minutes, which gives an average speed during the whole time away of 25.06 miles per hour. The quantity of coal taken was as under: December 3, at Crewe, 60 cwt.; at Camden, 80 cwt.; at Carlisle, 114 cwt.; December 4, at Camden, 80 cwt.; at Carlisle, 53 cwt.; total, 387 cwt., less 20 cwt. left on tender on arrival at Crewe, December 4, showing a consumption of 367 cwt., which equals 34.2 pounds per mile. Good running time was made during the trip, the loads being as under: December 3, 12.13 a.m., Crewe to Euston, 12 $\frac{1}{2}$ standard coaches; 10 a.m., Euston to Crewe, 10 $\frac{1}{2}$; 10 a.m., Crewe to Carlisle, 9 $\frac{1}{2}$; 8.41 p.m., Carlisle to Warrington, 13; December 4, 8.41 p.m., Warrington to Euston, 14; 10 a.m., Euston to Carlisle, 11 $\frac{1}{2}$; 8.41 p.m., Carlisle to Warrington, 13; 8.41 p.m., Warrington to Crewe, 14 standard coaches. Since April 9, 1889, the date the engine commenced work, she has run 50,905 miles, and during the week previous to the 1200 miles run she ran regularly from Crewe to Euston, thence to Carlisle, thence to Crewe, or a total of 600 miles on alternate days, the engine being worked by the same two sets of men, who changed at Crewe. This she is now doing on alternate days with her sister engine, the Oceanic.

Our Trade with Other American Countries.

We have extracted from the returns of the Bureau of Statistics for the fiscal year ended June 30 last the figures showing the import from and domestic export to other American countries in comparison with those of the previous fiscal year, reducing everything to thousands of dollars, and present the table herewith, followed by a recapitulation which exhibits the gratifying increase in our domestic export to nearly all quarters except Hayti, where a civil war was raging:

Our Trade with American Countries, in Thousands of Dollars.

Countries.	Import. Fiscal years.		Domestic export. Fiscal years.	
	1889.	1888.	1889.	1888.
Cuba	52,131	40,319	11,207	9,724
British West Indies	15,988	12,551	8,198	7,450
Hayti	3,757	2,919	3,975	4,323
Porto Rico	3,707	4,412	2,175	1,920
Santo Domingo	1,454	1,459	1,151	793
French West Indies	170	117	1,853	1,575
Danish West Indies	608	399	674	603
Dutch West Indies	194	388	619	581
Canada	43,009	43,084	39,807	34,432
Mexico	21,254	14,023	10,886	9,242
Guatemala	2,347	2,085	970	888
Nicaragua	1,747	1,496	901	861
Salvador	1,682	1,473	691	645
Costa Rica	1,442	1,600	966	1,065
Honduras	1,216	859	619	673
British Honduras	211	184	363	322
Miquelon	30	32	368	372
Brazil	60,404	53,710	9,277	7,064
Arg. Republic	5,455	5,902	8,376	6,099
Venezuela	10,360	10,051	3,704	3,008
Colombia	4,264	4,363	3,729	4,923
British Guiana	4,528	2,822	1,643	1,652
Dutch Guiana	460	431	255	264
French Guiana	13	12	141	140
Ch. H.	2,623	2,895	2,967	2,423
Uruguay	2,987	2,712	2,027	1,337
Ecuador	695	1,119	756	811
Peru	314	300	773	865
Bolivia	2	.....	7	22
Totals	243,061	222,015	120,167	106,577

Recapitulation.

Countries.	Domestic export. Fiscal years.	
	1889.	1888.
Spanish America (increase 13 per cent.)	52,905	46,799
Brazil (increase 29 per cent.)	9,277	7,064
Canada	39,807	34,432
Hayti	3,975	4,323
French, Danish and Dutch W. I.	3,145	2,759
British W. I., Honduras and Guiana	10,204	9,424
Dutch and French Guiana	396	404
Miquelon	368	372
Totals	120,167	106,577

Increase 13 per cent.

The outlook for the current fiscal year is most encouraging for South American countries, nearly all their products bringing remunerative prices, if we except dry Buenos Ayres hides. The latter are down to the unprecedentedly low quotation in New York of 14 cents. Sugar, it is true, is as cheap just now as it was in 1887 at this time of the year, but planters are indemnified by a large yield, and under the stimulus of a large consumption prices may improve toward summer, as they did last year. Coffee is still bringing extreme rates. Prosperity is general south of us. There are no political troubles to speak of anywhere, and it is fair to presume we shall export more domestic goods thither than in any previous year.

The Iron Age

New York, Thursday, January 23, 1890.

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CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Western Iron Trade.

The condition of the Western iron trade since the opening of the year has not been altogether satisfactory. Irregularities have developed which have caused more or less uneasiness among sellers of various classes of material, while buyers are wholly at sea in endeavoring to form a confident opinion with regard to the proper course for them to follow. Hardware jobbers are receiving encouraging reports from their traveling men with regard to prospects for trade in their respective territories, but immediate business in many localities is sadly interfered with by the wretched condition of the country roads, which at this season should be frozen hard and solid so that farmers can haul their grain to market. The open winter has brought about a renewal of the "mud embargo" which was such an annoying feature to Western trade a few years since. At the same time, the advances made on staple goods by manufacturers have offered inducements to cut prices to those who had supplied themselves with good stocks at low rates.

Pig iron suffers to some extent from efforts of speculators to unload, in anticipation of the time for making payment, which is fast approaching. The price has not advanced as rapidly as they supposed it would, hence they were not able to make a quick turn. Their efforts are supplemented in the same direction by consumers who bought beyond their needs in the belief that iron would go much higher, but are now anxious to make resales rather than pay out cash for stock which they will not need for some time. Furnace companies are quite firm, as they are well sold up and do not need to push business. Speculative lots and surplus stocks are known to be comparatively small and could easily be absorbed in a few days when trade is active, but just now an intermediate period has been reached, when few buyers are in the market and even light offerings are a burden. The open winter has enabled old material to be accumulated in much larger quantities than usual, and wrought scrap is receding in price, which gives rolling mills using such material an advantage over their competitors. Large contracts for bar iron are being placed, but at lower prices than have latterly prevailed, and the explanation is found above. Even steel rails are slow to move, although it had been supposed that by this time numerous orders would be coming forward from the smaller roads, whose earnings were large last year and who will need to make heavy renewals soon because they have been too poor to make extensive repairs for several years past.

The hopes of the trade are centered on the developments of the next 30 to 60 days. There are those who are accounted

among the shrewdest iron manufacturers in the West who are confident that an improvement will shortly be felt that will advance foundry and mill pig iron equal to, if not beyond, the present rates for Bessemer. They believe that the absorption of so much Northern furnace capacity for Bessemer this year will have marked effect as the weeks and months pass by, while a shortage of fuel among charcoal furnaces is becoming more and more probable with the passage of a winter almost without snow. The strength of the pig-iron market is unquestionably the strength of all forms of iron and steel, and its course will be watched with interest. The Southern makers have evidently determined not to force sales, and it will be well if Northern makers pursue the same tactics. If buyers are obliged to come forward first the market will be controlled by the makers and a good year will be assured. If, however, the financial necessities of the makers drive them in the field first the conditions will not be favorable for a maintenance of the present level of prices. In any event, it seems now to be extremely unlikely that prices will attain an extravagant height. From a Western point of view the prospects of a boom are fading.

Transportation and Manufactures.

Increased transportation facilities have had much to do with the diffusion of manufacturing industries. Influences which at one time would have been all-powerful to induce the establishment of a manufacturing enterprise at a certain point are not now considered as against a wholly different set of advantages presented by another location. The great aim once was to get as close as possible to the market for the products to be made. The cost of raw materials or their quality was a secondary matter when viewed in connection with a possible difficulty to be surmounted in the way of inadequate or costly transportation to the vicinity of the consumer. Blast furnaces were located in the neighborhood of foundries, to be as near as possible to their customers, even if lean iron ores and high-priced fuel had to be used because nothing else was available. Rolling mills were built in large towns and cities to be within easy reach of those requiring bar iron. The iron works which pioneers built in the wilderness, because they had a true conception of the advantages to be gained by the assemblage of raw materials close to their place of production, were usually so far in advance of the times that little or no profit was realized therefrom. A navigable stream was a vast assistance to such an undertaking, but it was rather a rare combination of circumstances which placed a navigable stream, iron ore and fuel in juxtaposition with one another. Even the early railroads were of but limited assistance, as their freight tariffs were almost prohibitory on bulky commodities intended to be conveyed any considerable distance.

The marvelous development of the railroad system of this country in very recent years is chiefly responsible for the present diffusion of industries. Manufacturing establishments would not have been located so generally at points specially adapted by nature to sustain them if the facilities for cheap transportation had been lacking.

It is true that manufactures and railroad building have gone hand in hand, the one assisting and often stimulating the other, but that the general manufacturing interests of this country are on a permanently solid basis is due to the energy and enterprise and perseverance of the railroad builders. Many miles of track may have been built in advance of the requirements of certain sections of the country, and investors in railroad securities may not have realized returns from them up to their expectations, but the masses of the people have been greatly benefited, and their obligation to their enterprising countrymen needs to be acknowledged. Cheapness of production has been made possible to a degree never dreamt of on this side of the Atlantic, and new industrial communities have sprung up in sections of the Union which seemed unalterably devoted to agricultural pursuits. This work of development shows no signs of being checked, but will continue during the coming year and the years following until every part of this broad expanse of ours is opened up and no treasure established by nature is not within reach of those anxious to divert it into the commercial channels of the country. If the present prosperous condition of business continues for a year or two, so that schemes now contemplated may be carried through successfully, the return of low prices will find our manufacturers better fitted than ever to endure the strain which is inseparable from periods of depression. Ever since high tide in prices was reached in 1872 every cycle of low prices has gone lower than the one which preceded it, and there is no reason to expect a variation in the next from the general course. But as the railroads have been making every cycle of low prices more endurable than its predecessor, there is reason to expect a continuance of the same conditions in the future.

The Interstate Commerce Association.

After a year's trial the famous bankers' and presidents' agreement has been practically abandoned in its present form. A period of exhausting war brought a desire for peace, and strong pressure was brought to bear by leading financiers to force the acceptance of an armistice. The Interstate Commerce Association which was formed gave rise to a hopeful feeling, and yet a year after it was solemnly organized important modifications must be made or the old days of intense and wasteful competition will return. In the middle of October the Union Pacific, the Chicago and Northwestern and the Chicago, St. Paul, Minneapolis and Omaha railroad companies entered into contracts, which competing lines formally complained of in the middle of December as contrary to the spirit of the agreement of the Interstate Commerce Railway Association and as in some respects in violation of its provisions. The complaint and the answer to it were referred to the chairman of the Executive Committee, A. F. Walker, whose report has just been published.

It is an able document, reviewing the situation fully and candidly. The offending lines propose to make rates between Nebraska and Northwestern points, with the intention to make Duluth and other Lake Superior points common with Chicago, and make St. Paul, Minneapolis and

their common points common with the Mississippi River. While these rates have not in fact been put, their publication would almost inevitably precipitate a rate war. But while they trench upon a subject that has been committed to association control, Mr. Walker looks upon the manner in which the contracts complained of deal with the question of division of traffic as a much more serious matter. In this respect the offending lines contemplate action which violates that article of the association providing that the divisions of all through rates on the traffic subject to the association shall be arranged through the association.

The lines which have entered into the contract complained of have in it arranged for a distribution of through traffic with the evident intention to accord to one another advantages not granted to other members of the association. The favors thus extended would soon force the rival roads into offering inducements to shippers and travelers, with the inevitable result of a fierce war. So far their position has not been clearly defined by the officers of the Union Pacific and of the Chicago and Northwestern, whose presidents were among the ardent advocates of the association whose agreements they are now virtually repudiating. They profess their desire to give their cordial support to efforts to be made toward the formation of a new association. It is claimed that competition outside of the association forced them to the step which they took. It is urged, with considerable show of justice, that the railroad situation has changed, and that a readjustment is necessary.

It is not too much to say, however, that the manner in which the necessity of it was emphasized is hardly calculated to inspire confidence in the integrity of the two lines as members of any organization which may become the successor of the present association. The developments of the near future will show whether some way can be discovered out of the present dilemma. A failure to do so is likely to plunge the Western lines into another rate war, an outcome which will certainly not be conducive to prosperity in the iron trade.

The Iron Trade in Great Britain.

The annual reports of some of the leading iron merchants and trade journals have just come to hand, with figures which it is interesting to study. For the Scotch iron trade we have the following data:

The Scotch Iron Trade.		
Demand.	1889.	1888.
Consumption of Scotch iron:		
Foundries.....	185,806	137,805
Mills and steel works....	576,389	450,844
Exports.....	445,236	422,732
Total demand.....	1,207,521	1,011,381
Stock December 31 (1889)...	1,035,840	(1888) 1,244,433
Total.....	2,243,361	2,255,814
Supply:		
Production.....	998,928	1,027,774
Stock December 31 (1889)...	1,244,433	(1887) 1,228,040
Total.....	2,243,361	2,255,814

These figures clearly show the character of the movements which led to the extraordinary rise in Scotland. Practically the demand increased by about 200,000 tons, which was taken out of stocks, because the production remained stationary. In addition to the native iron, the Scotch mills, foundries and steel works melt up a

certain quantity of English iron. The very large speculative advance in Middlesbrough pig, which is the chief competitor of the local iron in the Scotch market, cut down the consumption thereof from 427,000 tons in 1888 to 394,000 tons, so that the consumption in Scotland really increased only about 128,000 tons, the exports having gained about 22,000 tons.

Considering the quantity produced, the Cleveland district in the North of England has done relatively about as well. The demand increased by about 200,000 tons, in spite of the falling off in the coastwise shipments, which was, however, more than counterbalanced by the exports to foreign countries, Germany having taken 350,857 tons of Middlesbrough iron, against 261,586 tons in 1888. The stocks were quite heavily drawn upon, although it must be noted that the stocks reported include only the ordinary Cleveland iron, and not the stocks of hematite, basic and spiegeleisen. The following table gives the figures, arranged by us in somewhat different form, published by James Watson & Co., of Glasgow:

The Cleveland Iron Trade.		
Demand.	1889.	1888.
Consumption.....	2,021,904	1,841,653
Exports:		
Foreign.....	549,737	470,509
Coastwise.....	409,783	407,875
Stock, December 31 (1889)...	261,385	(1888) 472,628
Total.....	3,243,807	3,252,665
Supply:		
Production:		
Cleveland iron.....	1,528,646	1,459,302
Bessemer basic, spiegel.....	1,242,535	1,155,681
	2,771,181	2,614,983
Stock, December 31 (1888)...	472,628	(1887) 637,682
Total.....	3,243,809	3,252,665

The statistics for these two leading districts certainly are quite satisfactory, but in themselves do not furnish any adequate explanation of the great rise which has overtaken the English markets since the middle of September. Production of raw material must be strained very close to capacity when there are a very large number of furnaces idle and stocks are ample for all reasonable requirements.

The chief trouble seems to be with the supply of coke, which a year ago was selling in the North of England at 10½ shillings a ton delivered at the furnaces, while the average price at which furnacemen have contracted for the first half of 1890 was about 17½ shillings, and sales on a large scale have been made as high as 25 shillings, and 30 and 31 shillings is now asked. In Wales coke has advanced from 15 shillings last January to 24 and 25 shillings now. Iron ore, foreign and domestic, has also advanced quite considerably, and wages have reached a higher level. As usual, ironmasters point to the extreme quotations and figure out to their own satisfaction that they are not making much money at the higher prices. The majority of them have, however, contracted for raw materials at a lower level, and it is only the tardy purchaser who has any good cause for complaint.

From all accounts the manufacturing industries in Great Britain are very well employed, at very remunerative prices, although there, too, the claim is made that the advance in finished product has not kept pace with the rise in raw material.

The industry which has shown the greatest development in 1889 was undoubtedly that of shipbuilding, the new tonnage launched being 1,286,699 tons, against 903,687 tons in 1888 and the

former best record of 1,250,000 tons in 1883. The statement is made that in 1889 not less than 95 per cent of the tonnage launched was steel, but that now with present relative prices for iron and steel shipbuilding material there will be a tendency in favor of iron. It is reported that the shipbuilding firms have orders enough to carry them along for the greater part of the current year.

Australasian Federation.

It was decided at Sydney on December 12, that a conference for considering the subject of federation of all the Australasian colonies will assemble at Melbourne next month. There is a Federal Council in existence now, but it has no executive machinery; it was created by the British Parliament in 1885, and was intended to draw the colonies nearer to the mother country, and at the same time conciliate them. The manner in which England had settled the Chinese immigration question, the rivalry of France in the New Hebrides, and the partial annexation of New Guinea, had not been quite what Australia expected. Certain specially Australian questions have grown up, and the colonists find that in international affairs concerning them it will be better to be able to exercise some control, and, if need be, exert some pressure. The present scheme is chiefly pushed by Sir Henry Parkes, the Premier and Colonial-Secretary of New South Wales, who is following up his proposition for a federation somewhat upon the model of the Dominion of Canada. It grew directly out of the proposition for the formation of an Australian army, but it aims especially to overcome many gross evils of misgovernment which seem inseparable from the present system. Sir Henry, in elaboration of his project, suggests the abolition of all border duties and absolute free-trade between the colonies, guaranteed if necessary by official inter-colonial treaties; a uniform marriage law and a uniform railway gauge for the whole country. He proposes Albury, in New South Wales, as the capital of the confederation; it lies 351 miles to the Southwest of Sydney and 190 miles to the Northeast of Melbourne. Founded in 1824, this city has a population of 7000.

The amount of domestic merchandise which the United States export to Australasia is quite considerable; it reached \$11,076,053 during the fiscal year 1888 and it rose to \$12,252,147 during the following twelve months. It will, therefore, be a matter of some moment to us what fiscal policy is going to be adopted in Australia's dealings with countries abroad. Victoria, for example, may have to be reconciled by uniformly higher import duties throughout the federation.

On January 1, 1889, the population, including New Zealand, but exclusive of Fiji, was 3,775,015, spread over an area of 3,075,238 square miles. In 1888 the joint income was £27,240,565 and the outlay £26,630,976, the public indebtedness amounting to the large sum of £169,607,898, but for the bulk of this debt, all held in England, the colonies can show paying railways and other public works. The import in 1887 was £57,255,000, of which £25,422,000 came from England, and the export £50,553,000, of which £22,954,000 was sent to England.

In the same year the export of wool was 22,749,000 pounds. The gold export in 1888 was 1,449,558 ounces, worth £5,503,553. The entries and clearances of Australian ports were in 1888, 18,611 vessels of a joint tonnage of 14,689,766. In 1888, 10,286 miles of railroad were in operation and 1846 miles were building. The number of post-offices in 1887 was 5414, handling 160,654,529 letters and postal-cards, and 90,645,403 newspapers; there were 38,104 miles of telegraph in operation with 1921 offices and 9,653,012 messages dispatched. The figures we have given are amazing, considering how small is the population. They furnish proof not only of the activity and energy of the nation, but of its immense resources for industry and trade. This being the case, the result of the impending conference will be watched with the greatest interest, not only in England but in this country.

Pushing Trade in Africa.

It is apparently the doom of Africa to be divided into strips and sections by whatever party of traders has the enterprise and audacity to lay hands on her. For purposes of traffic she appears to be the common inheritance of mankind. Her stores of ivory, spices, metals and precious woods, supposed to be everywhere scattered with a lavish hand through her boundless wastes, tempt the invader. Of all the four quarters of the globe the African continent alone remained unexplored up to a recent period. But now her inmost recesses have been penetrated, and at various points along the entire circuit of her coasts European traders are knocking for admission. China, Japan and Corea each in turn have yielded to their pressure. In the case of Africa, the formality of a conquest is dispensed with, there being no organized power in possession sufficiently formidable to make a pretense of resistance. Even the hostile climate, which for centuries was supposed to present an impassable barrier, is in a large measure disarmed. The Portuguese were among the foremost to gain a foothold in the equatorial regions, but failing after the lapse of centuries, to take advantage of their opportunities beyond prosecuting a desultory traffic with Arab traders, they now find themselves jostled on all sides by powerful rivals. England, far from being contented with her acquisitions at Sierra Leone and Cape Town, extreme points on the west coast and in the south respectively, has determined to appropriate a broad strip of territory across the continent from East to West, and to maintain important trading stations for several hundred miles along the coast of Zanzibar, on the extreme east. It matters not that she met with a bloody repulse in the Soudan, where the bones of Hicks Pasha's 10,000 now whiten the desert, nor that the brave General Gordon was ruthlessly slaughtered and Khartoum abandoned. The Zambesi River and other routes to the great lakes of the interior are open and will soon be thronged by her traders. Meanwhile the Belgians on the Congo, the Germans at Zanzibar and the Portuguese at Delagoa Bay, are pushing forward in their varied schemes for commercial conquest.

Inevitably in a struggle for priority of possession where greed is so insatiable and the rights of either party so indistinctly defined, the friction arising must at times

generate a dangerous heat. Not long ago there was trouble with the Germans at Zanzibar. Later the scene of contention was shifted to the neighborhood of the Transvaal, where the British contractors, engaged in a railway scheme supposed to be inimical to Portuguese interests at Delagoa Bay, were summarily ousted. On some frivolous pretext the concession obtained by the contractors was declared to have been forfeited. Again, at the present moment the Portuguese find themselves confronted by the British lion. The bone of contention is a trading region not remote from Mozambique, and the British consul at that point disputes with the Portuguese agent Serpa Pinto respecting the limits of their jurisdiction, each claiming supreme authority. Without condescending to discuss the merits of the question the British Government peremptorily demands that the Portuguese stand back and withdraw their pretensions. The Portuguese ministry hastily comply, under the menace of a British fleet about to enter the Tagus, but simultaneously affirm that the treaty of Berlin has been violated and appeal to the treaty powers. In no case can it be supposed that England would assent to an extension of Portuguese authority and dominion such as would operate as a bar to her progress. As a question of legality it might be difficult to determine the rights of either of the contestants, if indeed they have any at all. He may laugh who wins.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., January 20, 1890.

The public hearings of testimony before the Committee on Ways and Means on subjects having a bearing upon the schedules of the proposed tariff bill has terminated. The chairman and members of the committee are now putting their measure into shape and hope to have it ready for report within two or three weeks.

The minority members who have been advocating the English system when in control have received the assent of the majority to a resolution asking from the Secretary of the Treasury schedules and exhibits of the customs revenue systems of Germany, France, Austria and other European commercial countries. This information was furnished in a comparative and exceedingly convenient and useful form during the labors of the Senate Committee on Finance and House Committee on Ways and Means during the legislative tariff agitations since the passage of the act of 1883. The call for this information by the minority causes considerable surprise, as the industries of the countries specifically named are more or less highly protected. The systems of England, Belgium and Holland alone are in line with their ideas. It is hinted that the minority are casting about for a less ultra position than that from which they have been operating. There is no doubt that the views expressed by the representatives from the South have had a positive effect. Although they are not willing to publicly admit it, it is evident that Messrs. Carlisle, Mills and Breckenridge realize that they must take up a reef or two in their tariff-reform movement if they wish to stand in with public favor at this time. These gentlemen say in their talk that they have no idea of abandoning their position, but they are casting about significantly for more light.

The metal schedule of the committee's bill does not differ materially from that prepared by the Senate in the long session of 1888. Wire rods and wire are classified, cotton ties are provided for specific-

ally and the tin-plate duty is made protective. The Republican members are now formulating the new measure, and will bring it before the general committee very soon. The disposition of the minority to contest its provisions or their willingness to give it simply a *pro forma* opposition there and organized opposition in the House will determine how long the measure will be held in committee. It is the talk of the minority now that they will make no dilatory opposition in committee. An effort will be made to get the tariff bill to the Senate not later than April.

The Senate and House Committees on Naval Affairs are getting themselves in line for some very effective work in the direction of naval construction. There is no issue on the fundamental proposition of building more ships. All are agreed on that point. The question is as to the number, size and distribution in classes. The chairmen of both committees, Senator Cameron and Representative Boutelle, are in favor of the maximum number, eight battle ships and a considerable fleet of auxiliary vessels, as cruisers, gunboats and torpedo-boats. The Secretary of the Navy and the committees are not only in harmony, but in frequent conference, working out their plans. In a general way the people may expect a liberal and comprehensive naval policy, and the iron and steel industries and the shipyards a great market and abundant work to meet the requirements of legislation.

Making Hooped Cast-Iron Guns.

Many of the contracts of the United States Government for army and navy apparatus are being filled by firms in Providence. The Builders' Iron Foundry have the contract for supplying 30 large 12-inch guns for the army; the naval torpedoes are made at the Hotchkiss Works, and two large double engines, to be placed in connection with the Thompson-Houston dynamos on the Government steamers Petrel and Vesuvius, have just been completed by the Armington & Sims Steam Engine Company. It was something like a year ago when the contract was made with the Builders' Iron Foundry, and 24 of the 30 guns have already been completed, so far as the casting is concerned. As the foundry also have a contract for hooping the guns they have commenced to turn the hoops, which come to them roughly forged from the Midvale Iron Works. A bill is before Congress asking an appropriation for 50 more of these mortars. The coast fortifications contemplated include 1100 of these guns.

After the casting and turning down of the gun—that is, when the cast iron body has been made—they have to be hooped with two rows of steel bands. The guns are known as 12-inch H. L. rifled mortars, cast iron, hooped with steel. Contract No. 1 was signed January 3, 1889, and calls for the 30 guns to be rough-finished by April 8, 1890. The foundry agreed to finish them thus at \$1475 each. The first casting was on March 12, 1889. This was cut up into about 100 different pieces for testing purposes. Each mortar is 11 feet over all and weighs something like 15½ tons. They are for seacoast defense, designed to be operated in groups of 16, with their firing directed entirely by one officer, who, by the previous study of a chart, can put his shot in any section of a harbor he chooses. Their regulation charge is 80 pounds R. H. brown prismatic powder, giving a muzzle velocity of 1152 feet for a projectile weighing 630 pounds, with a pressure of about 28,000 pounds per square inch on the powder chamber. The range of their charge and weight of projectile under an angle of 45° is about six miles, sufficient to pierce 6 inches of steel armor at that distance.

New machinery is constantly arriving to be used for finishing the mortars. It consists of milling, slotting, boring and turning apparatus, gun lathes and rifling attachments. This machinery is made by toolmakers all over the country, among the establishments being the Brown & Sharpe Mfg. Company, of this city; W. H. Warren, of Worcester, and Bement, Miles & Co., of Philadelphia, while a great deal of the special machinery is made at the Builders' Iron Foundry.

Work on the second contract will not begin, probably, till May or June. Some of the steel bands are now being shaved down. They must fit the mortar within in $\frac{1}{16}$ inch before they are shrunk on. To accomplish two or three objects at once, the big lathes operate on a mortar at two or three different points, shaving off the surface and boring at the same time. The iron of which the mortars are made comes from the Lanesboro Iron Company, of Pittsfield, Mass., and the Muirkirk Iron Company, of Muirkirk, Md.

A visit to the foundry upon the occasion of the casting of one of their large guns is an interesting and instructive experience. At about 4 o'clock in the morning the fires in the furnace—which contains the pigs of the best charcoal iron to be obtained—are started. This furnace is quite different from the ordinary furnace which is used for melting purposes, it being strictly a hot-air furnace, which melts the iron by the gases and heat from the large grate in front. From the time of starting the fires until almost 11 o'clock, when the iron is usually entirely melted, samples of the iron are taken out and tested, in order to note the amount of dross in the metal, but by 2 o'clock it is ready for casting.

CASTING.

The mold in which the cannon is formed is placed in a flask set in a brick well or pit some 20 feet deep. This flask looks like a large cannon placed upside down. It is about 18 feet long and is composed of six sections which are clamped firmly together. Each of these sections consists of about 1 inch of iron and 10 inches of clay lining, which has been baked hard. The preparation of the inside of these flasks is also an interesting study. A wooden mold, shaped something like a barrel, 33 inches in diameter, is placed upon a sort of platform inside of the flask. The soft clay is then pressed down and the mold is removed, while the flask containing the soft coating of clay is taken to the oven and baked. When all of the sections of the flask have been thoroughly baked they are clamped firmly together and the flask is ready, so far as the outside is concerned. The core, containing the above, is then placed inside of the flask. This arbor is an iron tube, hollow and fluted, and is wound on the outside with rope, which is covered with a layer of clay 1 inch thick, making a diameter of 11 inches. This is to form the bore of the gun. The whole affair is then ready for the reception of the metal.

After the iron has been melted the metal is tested again and again in order to be sure that it is in proper condition. Then, after a sufficient time has elapsed, and if the metal stands every test to which it is put, the top of the flask is removed and the stream of melted iron is started through a trough, which is some 25 feet long, to the flask. A fire has previously been placed in the bottom of the pit in order to thoroughly heat the outside of the flask. Between the flask and the furnace is placed a swivel basin, through which the molten iron passes with a rush, throwing the sparks and flames on all sides and passing on again toward the flask. In less than ten minutes the flask is full, and then the top is replaced, while the feed stream is turned into a large pig mold at one side of the basin.

Inside of the arbor is placed a quantity of cold water, so that while the hot fluid is rushing into the flask the inside may be kept cool. In this way—that is, by cooling the interior of the flask—each ring of iron shrinks toward the center as it cools, by this means forming a number of rings around the core. The water in the arbor is kept cool by a supply-pipe, which runs from the top to the bottom through the center, while the heated water is removed through an escape-valve and taken through the top of the arbor. The rapidity of the cooling of the metal is regulated by taking the temperature of the water at the outlet and the rate of flow into the jacket. These are estimated every hour.

After the flow has been stopped the work of casting is by no means completed, for it must be watched for a number of days. In about 24 hours the mass is cool and solid enough to permit of the removal of the arbor, and then the water is turned directly into the gun itself, when the difficult part of the operation is over. This cold-water core and arbor is the essential feature, which was the invention of General Rodman. It has been a great many years since a cannon was turned off in this city for the War Department up to the present time. Before the war this same foundry furnished a great many guns for the Government, so many, in fact, that at one time it was found necessary to enlarge the buildings that they might have the accommodation for turning out the many orders of this class. Since that time, however, the work has been sent chiefly to Boston and New York, but at last the Ordnance Board has granted the contract here, and as the results seem to be perfectly satisfactory there are no reasons why it should stop with this contract.

CLIFFORD.

Chrome Ore Lining.

One of the champions of the use of a neutral lining of chrome ore for the open-hearth furnace is M. Rémaury, a well-known French metallurgist. During the International Congress of Metallurgists, at Paris, M. Rémaury submitted some data relating to the work which Bell Bros. and Pourcel are doing in England. Pig iron averaging 3.60 per cent. of carbon, 1.8 to 2.5 per cent. of silicon, 1.5 to 1.6 per cent. of phosphorus, 0.06 to 0.02 per cent. of sulphur and 0.5 to 0.6 per cent. of manganese is worked in a chrome-lined open-hearth furnace with scrap and ore, previously roasted. Sometimes one-quarter Bilbao ore is employed. He stated that the chrome ore lining resists well both for silica and siliceous cinder and remains neutral to strong bases. The pieces of chrome ore for the lining are bound by a little lime mortar. The bottom is made when the furnace is cold. Rémaury, as a proof of the life of the chrome ore lining, states one furnace at Alais, France, has been running with the same bottom for three years.

At Port Clarence, where the works of Bell Bros. are located, the charge consists of 10 tons of pig iron, 3 tons of iron scrap and 2 tons of steel scrap, to which afterward limestone and ore are added. After melting for two to five hours the cinder is removed, carrying with it 50 per cent. of the phosphorus. More ore is then added. The total time required for one charge is nine and a half to ten hours. The ferro-manganese, of which 0.7 to 0.8 per cent. is used, is added in the casting ladle. The steel produced contains only 0.02 to 0.04 per cent. of phosphorus. The steel, it seems, carries also a small quantity of chromium, to the presence of which the excellent mechanical tests obtained are partly attributed.

PERSONAL.

At the annual meeting of the Engineers' Club of New York the following officers were elected: President, Chas. Macdonald, New York City; vice-presidents, J. C. Bayles, J. F. Holloway, New York City; treasurer, A. C. Rand, New York City; secretary, David Williams, New York City; trustees, James A. Burden, Troy, N. Y.; Horace See, John C. Kafer, John Bogart, New York City; Eckley B. Cox, Drifton, Pa.

Horace Loomis, a well-known civil engineer, has accepted the office of Commissioner of the Street Cleaning Department in New York, to succeed Mr. Coleman, and good work is predicted—as of all new brooms.

Prof. C. F. Chandler lectured before the Engineering Society of the School of Mines on Friday evening upon the "History of Photography."

The following were elected officers of the Engineers' Club of Philadelphia: President, Prof. H. W. Spangler; vice-president, Wilfred Lewis; secretary and treasurer, Howard Murphy; directors, John T. Boyd, George Burnham, Jr., E. V. d'Inville, Henry G. Morris, S. M. Prevost.

Joseph M. Wilson was elected president of the Franklin Institute, in Philadelphia.

The American Society of Civil Engineers has elected the following officers: President, William P. Shinn; vice-presidents, A. Fteley, Mendes Cohen; secretary and librarian, John Bogart; treasurer, George S. Greene, Jr.; directors, Charles B. Brush, Theodore Voorhees, Robert Van Buren, William Ludlow, William G. Curtis.

Although still seriously ill, A. R. Whitney, of New York, passed the crisis last week.

Gus C. Henning is about to go to Johnstown, Pa., for a protracted stay, to take charge of the construction of the rack rail for the Pike's Peak Railroad. This will be the first road in this country built under the Abt system. It will reach an altitude of 14,000 feet, the highest reached by rail. The maximum grades of the road will be $16\frac{1}{4}$ °, and the minimum speed six miles an hour.

A new rapid transit bill introduced at Albany is a substitute for Mayor Grant's bill of last year. It provides for the creation of a board of seven commissioners—the Mayor of the city and six persons named—who are empowered to locate the routes and determine the kind of rapid transit. Its decision must be approved by the Aldermen. The consent of one-half the property owners along the route adopted must be secured, or in lieu thereof the approval of a commission appointed by the Supreme Court. No part of Fifth or Madison avenue, or Fourth avenue above Forty-second street, or Broadway below Thirty-third street can be taken, except that a road may be built under Broadway. When the board has agreed upon routes and plans and obtained the required consent of the Aldermen and property owners or the Supreme Court Commission the franchise is to be put up at public auction. The men or company that get it are to organize, build the road and operate it under the provisions of the act and the control of the Rapid Transit Board. The undertaking is to be done by private capital. Its control is to be in the public authorities.

Contracts have been closed at Norfolk, Va., for the construction of extensive piers for coal and merchandise and for an ironclad warehouse with double tracks.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 50 Dearborn street,
CHICAGO, January 20, 1890.

Pig Iron.—The furnace companies maintain a firm front, the situation having been decidedly strengthened by the attitude of the Southern contingent. The prices named for Southern Coke Irons are now above the market here, except in the case of speculative lots, which are to be had at a somewhat lower rate. The present danger to the maintenance of values lies in the effect which such lots are likely to produce. Small quantities of Lake Superior Charcoal are being offered by outside parties in the same way, and consumers of Coke Irons who have purchased beyond their requirements are seeking to make resales. The ordinary demand can probably be depended upon to absorb all such offerings if the furnace companies will exercise sufficient patience and await their opportunity. Cash quotations in the regular way are as follows, f.o.b. Chicago:

Lake Superior Charcoal.....	\$23.00 @	\$23.50
Local Coke Foundry, No. 1.....	20.00 @	21.00
Local Coke Foundry, No. 2.....	19.50 @	20.00
Local Coke Foundry, No. 3.....	18.50 @	19.00
American Scotch (Strong Soft), No. 1.....	21.25 @	21.50
Ohio Silveries, No. 1.....	19.75 @	20.00
Southern Coke, No. 1.....	20.75 @	.....
Southern Coke, No. 2.....	20.25 @	.....
Southern Coke, No. 3.....	19.75 @	.....
Tennessee Charcoal, No. 1.....	22.00 @	22.50
Alabama Car Wheel.....	26.00 @	27.00

Bar Iron.—The demand continues to come almost entirely from Car builders, who have bought quite freely of Bars and Axles during the past two weeks. Several orders for 500 to 1000 tons each were taken last week, but in nearly every case the local mills were the successful bidders. The Chicago Bar Iron market is coming more and more under the control of the mills of the city and vicinity, so that Mahoning Valley quotations are losing their significance here. The price at which recent car orders for Bars were taken was 1.85¢, flat, and manufacturers openly assert their willingness to contract freely for forward delivery at that rate. The abundance of Scrap, which is accumulating more rapidly than usual, owing to the open winter, causes a weakness in that material which operates to the advantage of the Bar mills. Probably 1.90¢, half extras, is about the ruling rate on mill lots of Common Iron, f.o.b. Chicago, ordinary specifications. That consumers are obliged to pay high prices for special qualities is shown by a sale of 200 tons at 1.95¢, Pittsburgh. Car Axles are selling at 2.30¢ @ 2.35¢, Chicago, with an excellent demand for them. Small lots of Common Iron are quoted at 2.10¢ @ 2.20¢ from store.

Structural Iron.—Almost every week brings forward a new building project of important dimensions, and the prospect for work of that character is most excellent. Architectural foundries, however, are extremely dull at present and their owners are not deriving much comfort from the outlook, castings being so largely displaced by Steel in modern construction.

Plates, Tubes, &c.—Heavy Sheet Iron has been a shade lower from mill during the past week, owing to offerings by new concerns anxious to get orders to start with. Buyers were limited to quick deliveries, however. Futures seem to be firmly held. The trade of the week was very good, both in mill lots and in store. Some excellent orders were taken for Tank Steel. Dealers continue to quote as follows: Nos. 10 to 14 Sheet Iron, 2.85¢ @ 2.95¢; Steel do., 3.15¢ @ 3.25¢; Tank Iron, 2.75¢ @ 2.80¢; Tank Steel, 3¢ @ 3.10¢; Shell Iron and Steel, 3.25¢; Flange

Steel, 3.50¢; Fire-Box, 4.25¢ @ 5.50¢; Boiler Rivets, 4¢ @ 4.25¢; Norway Rivets, 40 ¢; Boiler Flues, 1½ inches and less, 50 ¢; 2 inches and over, 55 ¢.

Sheet Iron.—The consumption of Galvanized Iron is very great in this vicinity, and stocks go out of the warehouses about as fast as they can be received. Leading sizes are again running short. Manufacturers talk of a further advance, but no change has occurred since last week. Jobbers quote small lots of Juniata at 50 and 10 ¢ to 60 ¢ off. Black Sheets are still quiet. Mill lots of No. 27 Common are quoted at 3.30¢, Chicago, and small lots from store at 3.40¢ @ 3.50¢.

Merchant Steel.—Trade is irregular in volume, some houses reporting a good demand, while others are having a quiet time. Prices are unchanged at 2.85¢, Chicago, for carload lots of Machinery, Toe-Calk and Spring Steel and 3¢ @ 3.25¢ for small lots; Tire Steel and Soft Stock, 2.50¢ rates from store; Tool, 7½¢ and upward; Crucible Sheets, 7¢ @ 10¢.

Steels Rails and Fastenings.—Business has been quiet in this line. Orders for Steel Rails are not only small, but inquiries are slow in coming forward. Sellers maintain quotations at \$37.50, however, and look to a much more active condition of affairs shortly, as renewals must be made on a large scale this year, and the railroads are in a better condition financially than they have been for a long time. Soft Steel Splice Bars are quoted at 2.25¢; Iron do., at 1.90¢ @ 2¢; Spikes, 2.25¢; Square-Nut Bolts, 2.80¢ @ 2.85¢; Hexagon do., 2.95¢ @ 3¢.

Old Rails and Wheels.—Old Iron Rails have been less active, but are still quoted at \$26.50. Old Steel Rails are in steady demand, and sales were made during the week at \$20.75 for short pieces and \$21 @ \$21.25 for long lengths. Old Car-Wheels were active early in the week and quiet at the close, with prices ranging from \$20 to \$20.50.

Scrap.—A curious feature in Old Material is the scarcity and firmness of low-grade stock, while high-class Scrap is abundant and comparatively weak. Steel holds its own very well, being taken by consumers about as rapidly as it is collected. Dealers quote selling prices as follows. ½ ton of 2000 lb: No. 1 Forge, \$20.50 @ \$21; No. 1 Mill, \$16 @ \$16.50; Nos. 2 and 3 Mill, \$11 @ \$11.50; Horseshoes, \$19; Old Axles, \$25.50; Fish-Plates, \$23.50; Pipes and Flues, \$15.50; Cast Borings, \$10; Wrought Turnings, \$14; Axle Turnings, \$15; Stove Plate, \$11; Machinery Cast, \$14; Mixed Steel, \$16.50; Leaf and Coil Steel, \$20; Tires, \$21.

General Hardware.—Jobbers of Shelf Hardware report a far better trade than in the corresponding month of last year. Traveling men send in very encouraging statements of the outlook in the territories which they cover, though a "mud embargo" is a serious obstruction to a very active movement in goods in many localities of the West and Northwest. It is regarded in the light of a merely temporary drawback, however. Missouri River trade promises to be exceptionally good. Prices of staple goods are somewhat irregular, as the advances made by manufacturers have not been closely followed by jobbers with good stocks laid in at low rates. The condition of trade is such that serious demoralization is not likely to ensue. Low sellers are merely giving away profits which they could easily secure for themselves. Heavy Hardware continues to move freely.

Nails.—Manufacturers' agents report a light inquiry for Cut Steel Nails, which are quoted at \$2.50, at factory, while Wire Nails are in better request, with quotations for large lots ranging in the

neighborhood of \$2.95, Chicago. Small lots from store are quoted at \$2.70 for Steel and \$3.15 for Wire, with 5 ¢ off for carload lots, but some shading of these prices is being done.

Barb Wire.—The 3.45¢ rate for small lots of Painted was evidently too rapid an advance for the market to sustain, as some jobbers are cutting this price 10¢ @ 100 lb. Manufacturers claim, however, that they are adhering to 3.25¢ for quantity lots, and that the jobbers will be obliged to firm up to corresponding figures to their trade. Galvanized maintains its usual difference of 60¢ @ 100 lb.

Pig Lead.—The Chicago market has been exceptionally animated the past week. Transactions to the extent of 1300 tons are reported. Prices were firm at the beginning of the week, but closed easier, in sympathy with a weaker feeling in other markets. The range was 3.70¢ @ 3.67½¢.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, January 20, 1890.

Pig Iron.—A review of the local market for Pig Iron during the past week is very unsatisfactory. Furnaces have not allowed agents to vary from the strict letter of instructions, which saddles the advance in freight rates upon buyers who are willing or compelled to enter the market. Consumers have not ceased to test the mettle of producers, but are equally obdurate as furnaces in determination to withstand the demands of the Southern stacks. The very unusual attitude of furnaces, brought about by recent events, causes some curiosity among buyers to see agents and hear particulars personally, but their attendance upon the market does not increase the volume of business, and very little not already known is to be learned. Outside of Southern brands, however, there has been a moderate volume of business, Northern stacks being more flexible than Southern producers within certain limits, yet this does not mean the market is not firm for Northern brands. Sales of Mahoning and Shenango Valley Irons are reported on basis of quotations, and there has been a little demand for Charcoal as well as for Coke Iron. Nothing is reported in Car-Wheel Iron, but a very firm tone prevails at full prices for Southern, while Lake Superior Iron has been further advanced. In the following table the inside prices represent buyers' views, while the outside quotations are generally asked by holders. But in the absence of much business the prices retain much of a nominal character, being at the best only approximate, for cash, f.o.b. Cincinnati:

Foundry.		
Southern Coke, No. 1.....	\$19.00 @	\$19.45
Southern Coke, No. 2.....	18.00 @	19.00
Southern Coke, No. 3.....	17.50 @	18.50
Ohio Soft Stone Coal, No. 1.....	18.50 @	19.00
Ohio Soft Stone Coal, No. 2.....	17.50 @	18.50
Mahoning and Shenango Valley.....	18.00 @	18.50
Hanging Rock Charcoal, No. 1.....	21.00 @	23.00
Hanging Rock Charcoal, No. 2.....	20.00 @	22.00
Tennessee and Alabama Charcoal, No. 1.....	19.00 @	20.00
Tennessee and Alabama Charcoal, No. 2.....	18.50 @	19.00
Forge.		
Gray Forge.....	17.00 @	17.50
Mottled Neutral Coke.....	16.75 @	17.25
Car-Wheel and Malleable Irons.		
Southern Car-Wheel.....	24.00 @	24.50
Hanging Rock, Cold Blast.....	22.00 @	25.00
Lake Superior Car-Wheel and Mal- leable.....	23.00 @	25.00

Manufactured Iron.—There has been a fair volume of business and a steady market without further change in prices.

Nails.—There has been a fair volume of business and the market has continued firm at previous quotations: Iron and Steel Nails, 12d to 40d, sell at \$2.40 @ \$2.50 ½ keg, with 10¢ rebate in car lots, at mill; 50d to 60d at 25¢; 10d, 10¢; 8d and 9d, 25¢; 6d and 7d, 40¢; 4d and

5d, 60¢; 3d, \$1, and 2d, \$1.50 per keg more; Steel Wire Nails sell at \$3.10 @ \$3.20 for 60d.

Old Material.—There has been some little demand for Old Rails, with sales of moderate amounts at \$26.50 on O. & M. Railroad; at other points prices vary from \$27 to \$27.50 per ton; Old Wheels are dull and prices are nominal at \$19 @ \$19.50, cash.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, January 20, 1890.

Pig Iron.—The market has not shown that extreme stiffness and tendency to advance that prevailed prior to week just passed. It cannot be said, however, that prices are at all off, but the supposition is that large round orders could be placed with the producers for future deliveries, say three to six months off, more easily than they could have been a couple of weeks ago. Some of the producers are of the opinion that the top figure for iron has been reached, but that prices will remain about as they are for some time to come. Nearly all the Southern stacks are in a very independent position so far as the next two or four months are concerned, and are not at all anxious to sell at anything off from present ruling rates, but the probability is that quite considerable amounts could be bought for far-off deliveries at some concession from a basis of \$16 for No. 1 at the furnaces. Another indication appears upon the surface touching the general feeling of the Iron market. Some parties who have had occasion to purchase Rails here had concessions offered them of about 50¢ per ton from what they were asked a couple of weeks ago. Unless something should transpire to cause again an upward turn of the market the present outlook would appear to indicate that for a few weeks the market will remain about stationary, and probably conservative, which is looked upon by our Southern financiers as much the best position that it can be in. Rumors of 100-ton plants about to be started are as prevalent as ever, but it mostly originates from embryo town builders that generally "die a bornin'." The Southern lines have advanced rates 5¢ per 100 on all Iron products. As yet the rates on Pig have not been disturbed from the producing centers to the Southern foundries.

Louisville.

LOUISVILLE, KY., January 20, 1890.

Pig Iron.—There are no new features in the condition of affairs at this point. The week has been rather a dull one. Very little Iron is being offered and only for near-by deliveries. Inquiries have been light, and only a few sales of small lots have been reported. Prices remain, nominally, the same as last week:

Southern Coke, No. 1 Foundry (new classification).....	\$18.25 @ \$18.75
Southern Coke, No. 2 Foundry (new classification).....	17.75 @ 18.25
Southern Coke, No. 3 Foundry (new classification).....	17.25 @ 17.75
Gray Forge.....	16.75 @ 17.25
White and Mottled, different grades.....	15.50 @ 16.50
Silver Gray, different grades.....	16.25 @ 17.25
Southern Charcoal, No. 1 Foundry.....	18.50 @ 19.50
Southern Charcoal, No. 1 Mill.....	17.00 @ 17.50
Southern Car-Wheel, standard brands.....	23.50 @ 24.50
Southern Car-Wheel, other brands.....	19.25 @ 21.75
Hanging Rock Coke, No. 1 Foundry.....	18.50 @ 19.00
Hanging Rock Charcoal, No. 1 Foundry.....	22.00 @ 22.50
Hanging Rock, Cold Blast.....	24.00 @ 26.00

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., ST. LOUIS, January 20, 1890.

Pig Iron.—The market remains in a comparatively quiet condition, although there is no direct evidence of weakness noticeable. Some medium-sized lots of

Iron, which were held by speculators and bought some months since at lower prices, have been sold during the past week at prices that can be termed inside figures. There is an understanding or agreement reported to have been made between two of the larger Southern furnaces, who have been close competitors, to adhere to a certain line of prices, which are about \$19.50 for No. 1 Foundry, \$19 for No. 2 Foundry, \$18.50 for No. 3 Foundry and \$18 for Gray Forge. The two furnaces referred to with others, who will naturally follow their lead, will be able to control from 60 % to 75 % of the product from that section. Under these circumstances it seems probable that this action on their part will go far toward sustaining the market until demand sets in, even if it does not further advance prices now ruling. For ordinary-sized lots we quote as follows for cash, f.o.b. St. Louis.

Southern Coke, No. 1 Foundry, \$19.50 @ \$20.00	
Southern Coke, No. 2 Foundry, 18.75 @ 19.25	
Southern Coke, No. 3 Foundry, 18.25 @ 18.75	
Gray Forge..... 17.75 @ 18.25	
Ohio Softeners..... 20.00 @ 21.00	
Lake Superior Charcoal..... 24.00 @ 24.50	

Missouri.

Charcoal Foundry, No. 1.....	22.00 @ 22.50
Charcoal Foundry, No. 2.....	21.00 @ 21.50

Tennessee.

Charcoal Foundry, No. 1.....	20.00 @ 20.50
Charcoal Foundry, No. 2.....	19.25 @ 19.75

Connellsville Coke, f.o.b. East St. Louis, \$5.25; St. Louis, \$5.40.

Bar Iron.—The demand keeps up well for the season, and prices are firmly adhered to as follows: Small lots from store, 2.15¢. Lots from mill command 2¢.

Barb Wire.—Trade continues fairly active and prices as a rule are firmly held. Mills talk of advancing prices just as soon as the demand will warrant, claiming that it is entirely out of the question to sell at present quotations in the face of the increased cost of raw materials. The following prices are the basis on which small lots are sold: Painted, 3.30¢ @ 3.35¢; Galvanized, 3.90¢ @ 3.95¢. Carload lots, 10¢ per 100 lb less than above prices.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., January 21, 1890.

It is difficult to define the exact condition of the market, as different opinions are held by different parties. It is certainly a dull market, and in some directions there are indications of weakness, but this is not uniformly the case. Hence it cannot be said that prices are lower, although in some cases concessions could be had which were not obtainable three or four weeks ago. Whether this will become the rule instead of the exception depends upon the outcome of events during the next two or three weeks. A moderate improvement in the demand would probably turn the tide toward firmer prices, while a continuance of the present apathy and indifference would have the opposite effect. The trade are waiting to see which of these alternatives will be developed and are not inclined to assume any decided change of position until the outlook becomes clearer than it is at present, although the general impression is that the dullness is incidental to the season and should not be regarded as an indication of any permanent reaction.

Pig Iron.—Prices are not quotably lower, although they are more irregular and in some cases less firm than they have been for several weeks. As a rule, all the leading furnaces are pretty well sold up, and so far as known deliveries are being promptly taken, so that the offerings are extremely light. There is more or less outside Iron offering, however, and although it does not amount to much in the

aggregate it is sufficient to influence quotations. That is to say, most of the Iron offered is at prices a little below the market, and although there may be the full difference in quality between it and standard brands it goes on record as Mill Irons offering at \$17 @ \$17.50, or No. 1 at \$19.50, &c., and has its effect. As a matter of fact, standard brands are not offered within 50¢ to \$1 per ton of those prices, and it is at least open to doubt, whether even small concessions could be had on first-class Iron. But it is a significant feature that prices have lost their uniformity. Some Iron at any rate—be the quality what it may—can be made available at lower prices than could have been done two or three weeks ago, which is not a good sign. The steady increase in the output also encourages buyers to hold off. Consumption may be large, it will be large, but with so much additional Iron coming on the market it is impossible to get up any scare, so that consumers are determined for the present to take only such small lots as are required for immediate use. Prices are nominally about \$20 @ \$20.50 for good to choice No. 1, delivered at tide, \$18.75 @ \$19.25 for No. 2 and \$18 for Gray Forge. Southern Irons are offered at a trifle less than the above quotations, and on offers for good-sized lots it is not unlikely that a sharp reduction would be submitted to rather than lose the chance of a sale.

Bessemer.—Not much demand at present, although \$22 at furnace would probably be a fair average quotation.

Spiegeleisen.—There is a good deal of inquiry for small lots, for which sellers quote \$38 @ \$38.50 for 20 %, with buyers at about \$1 less money. Ferro. sold at \$87 for 70 %, and 80 % is held at \$100 @ \$102.

Billets.—There is a good deal of inquiry yet, although prices are a little unsettled. Some quote \$39 @ \$39.50, delivered in consumers' yards in the neighborhood, but there is reason to believe that \$38.50 @ \$38.75 has been accepted in one or two instances within the past few days.

Muck Bars.—The market is irregular and feverish. Bars appear to be wanted, and although lower prices are talked we have been unable to find any good Bars at less than \$32, at mill; some ask \$32.50. One or two lots made from inferior material were sold at comparatively low figures, but the general market is \$32 @ \$32.50, at mill, asked, and with light offerings there is no disposition to make concessions.

Bar Iron.—The market is dull and prices hardly as firm as they were some time ago. The demand is not large, owing to the heavy purchases made during November and December, and even these are not specified for as manufacturers were given to expect. The consequence is that orders for immediate delivery would be taken at slight concessions, so as to secure immediate employment. It is believed, however, that the dullness will not continue for any length of time, and that there will be plenty of business in course of a week or two.

Skelp.—Is in better demand, with some good-sized sales at about 1.95¢ for Grooved, 2.15¢ @ 2.20¢ for Sheared and 1.95¢ @ 2¢ for Best Refined Bars.

Plates.—The market, as in most other specialties, is a little dull at the moment, but there is no scarcity of work. Some of the orders are not specified for as promptly as could be desired, for which reason immediate business would in some cases be taken at slight concessions, so as to secure immediate employment. But there is no general weakness, and any material renewal of the demand would soon lead to higher prices. Meanwhile

prices are a little irregular, but usually quoted about as follows, delivered:

	Iron.	Steel.
Tank.....	2.35¢	2.75¢ @
Shell.....	2.65¢	3.00¢ @ 3.1
Flange.....	3.25¢	3.25¢ @ 3.35
Fire-Box.....	3.75¢	3.75¢ @ 4.25
Angles.....	2.90¢	2.75¢ @

Structural Material.—There has been rather more inquiry for Bridge material, but the amount of business closed is not important. Mills are fairly well supplied with orders, however, and if specifications are sent in promptly there will be plenty of work. The outlook is good and there is every reason to expect a continuance of activity for some time to come. Prices are as follows: About 2.35¢ @ 2.40¢, delivered, for Iron Bridge Plate; 2.30¢ @ 2.35¢ for Angles, with 20¢ @ 25¢ more for the same in Steel. Tees, 2.8¢ @ 2.9¢; Beams and Channels, 3.1¢ for either Iron or Steel.

P. S.—Orders for a little over 2,000 tons were closed to-day, at slight concessions on both Plates and Angles (Iron).

Sheet Iron.—There is an improving demand and mills are getting about all they can handle. Prices are firm as last quoted—viz., for carload lots:

Best Refined, Nos. 14 to 20.....	3.10¢
Best Refined, Nos. 21 to 24.....	3.30¢
Best Refined, Nos. 25 to 26.....	3.50¢
Best Refined, No. 27.....	3.60¢
Best Refined, No. 28.....	3.70¢
Common, ½¢ less than the above.	
Best Soft Steel, Nos. 14 to 20.....	3¼¢
Best Soft Steel, Nos. 21 to 24.....	3½¢
Best Soft Steel, Nos. 25 to 26.....	3¾¢
Best Soft Steel, No. 27.....	4¼¢
Best Soft Steel, No. 28.....	4½¢
Best Bloom Sheets, 1-10¢ extra over the above prices.	
Best Bloom, Galvanized, discount.....	60 ¢
Common, discount.....	62½ ¢

Steel Rails.—The market is not active, but prices are firm at slightly higher figures than quoted last week. The nominal rate is \$36 at mill, but for desirable orders as to size and date of delivery it is not unlikely that \$35.50 or a fraction less might be accepted. But the mills are all busy, and with a continued favorable outlook there is a good basis for firm, if not higher, prices.

Old Rails.—There is a good inquiry for foreign Rails, and for desirable lots \$20, Philadelphia, could be obtained for T's. American Rails would bring \$27.50 @ \$28, or for interior delivery \$28.50, but the offerings are somewhat limited, so that there is no difficulty in maintaining the figures recently quoted.

Scrap Iron.—The demand keeps up pretty well, although prices are hardly as firm as they were a little while back. Quotations are nominally as follows: No. 1 Wrought, \$24.50 @ \$25, Philadelphia, or for deliveries at mills in the interior \$26 @ \$26.50; \$16.50 @ \$17 for best Machinery Scrap, \$15 @ \$15.50 for ordinary, \$15.50 @ \$16.50 for Wrought Turnings, \$11 @ \$11.50 for Cast Borings, and \$28 @ \$30 for Old Fish-Plates.

Nails.—The market is dull and prices not more than steady. Nominal quotations are \$2.10 @ \$2.20 for Iron Nails, but carloads are offered at concessions from the inside figure.

Wrought-Iron Pipe.—There is a good demand, considering the season. Mills have all the work they can handle, and prices are well maintained. Discounts as follows: Butt-Welded Black, 50 %; Lap-Welded Black, 62½ %; Butt-Welded Galvanized, 42½ %; Lap-Welded Galvanized, 50 %.

Detroit.

WILLIAM F. JARVIS & Co., under date of January 20, 1890, say: There have been inquiries for a large amount of Lake Superior Charcoal during the past week, and several orders for round lots have been booked. Should the inquiries re-

ceived result in orders it is very probable that prices will be forced up another notch. Instead of a lull in the market, as was anticipated, there is every prospect of increased buying. The demand is more for Lake Superior Charcoal and Bessemer. Foundry Irons are not asked for, except in small quantities, and on some brands a slight weakness is shown. We make no change in our quotations of last week:

Lake Superior Charcoal, all numbers.....	\$23.00 @ \$23.50
Lake Superior Coke Bessemer.....	25.00 @ 25.50
Katahdin (Maine Charcoal).....	26.00 @ 26.50
Lake Superior Coke Foundry, all ore.....	22.50 @ 23.00
Lake Superior Coke Foundry, cinder mixed.....	20.25 @ 20.75
Standard Ohio Blackband.....	21.00 @ 22.00
Southern No. 1.....	20.50 @ 21.00
Southern Gray Forge.....	19.25 @ 19.50
Jackson County (Ohio) Silvery.....	19.50 @ 20.00
Old Car-Wheels (nominal).....	21.50 @ 22.50

Cleveland.

CLEVELAND, January 20, 1890.

Iron Ore.—The Ore market is quiet and is only disturbed now and then by orders for round lots of non-Bessemer from furnacemen east of the Alleghenies. Estimates of amount of non-Bessemer Ore already sold vary from 1,250,000 to 2,500,000 tons. The former figure is probably not far from the truth. There has been little in the situation in the Pig Iron market to warrant the demand for non-Bessemer that has been persistently made for the high grade Ores. Negotiations between the owners of the non-Bessemer mines and the manufacturers of non-Bessemer Pig have been conducted very quietly, but prices have been about \$4.50 @ \$4.75, f.o.b. vessels Cleveland, with a few scattering sales at \$5, same delivery. The inquiries from Eastern furnacemen are great enough to warrant the conclusion that over 4,000,000 tons of non-Bessemer Ore will be sent forward from the mines in 1890. Vesselmen are still making charters at \$1.10 @ \$1.15 from Escanaba; \$1.25 from Marquette, and \$1.25 from Ashland. Vessels sufficient to transport 5,000,000 tons of ore have already been engaged.

Pig-Iron.—The market is quiet in almost every detail of the trade, although prices are firm and the occasional sales reported are in accordance with the quotations existing for several weeks. Sales of Bessemer Iron have been reported from the Mahoning Valley for Pittsburgh delivery at about \$24, cash, at the furnace. No. 1 Foundry Iron, all lake Ores, at \$19.50 cash, at the furnace, is selling with considerable freedom. Activities will not be resumed in the Pig-Iron market, however, for several days.

Manufactured Iron.—Sheets are remarkably scarce. Common Bar has advanced in value to 1.90¢ and new orders for large quantities will not be booked below 2¢.

Scrap-Iron.—Plenty of Old American Rails are in sight, but there is slight demand for them at the existing quotations, \$28 @ \$28.50.

Pittsburgh.

Office of The Iron Age, Hamilton Building, (PITTSBURGH, January 21, 1890.)

The outlook for a good spring trade was never better, and there will be increased demand for raw materials within the next few weeks.

Pig Iron.—The quietude noted for some weeks past continues, and there is no disputing that the market is easier. Consumers are holding back, while sellers are more anxious. However, there is but little offering; nearly all the furnaces, not only in this district, but tributary to the market, are sold up, and producers generally are about as indifferent as consumers; but the few furnace men in condition to sell do not find it near as easy to effect

sales as it was a month or so ago. Consumers are not anxious now to anticipate future wants, as they are not apprehensive of any further advance for the present, at least; hence they will make no more contracts until they have used up what they have. Bessemer Pig is decidedly weaker, and prices, as compared with some of the sales reported two weeks ago, have gone off from 50¢ to \$1 ½ ton. There is more offering, which is owing to the fact that a number of furnaces have gone off Mill on to Bessemer, as there is a much better margin for the furnace men on the latter at present prices. One year ago the difference between Mill and Bessemer was from \$1.50 to \$2, whereas at present and for some time past it has been from \$5 to \$5.50 ½ ton. Mill Irons are also weaker, although we make no change in our quotations on standard brands. Brokers all admit that business has fallen off, but some of them fail to see that any weakness has been developed, yet it exists, all the same. With an improved demand, which is not improbable, within the next few weeks, as many consumers are getting down in stock and will have to replenish, although as long as the market remains in its present condition, it is not likely that they will buy beyond their immediate actual wants, we quote prices as follows:

Neutral Gray Forge.....	\$18.00 @ \$18.50, cash.
All Ore Mill.....	19.50 @ 20.00.
White and Mottled.....	17.00 @ 17.50. "
No. 1 Foundry.....	17.50 @ 18.00. "
No. 2 Foundry.....	19.00 @ 19.50. "
No. 1 Charcoal Foundry.....	24.00 @ 25.00. "
No. 2 Charcoal Foundry.....	22.00 @ 23.00. "
Cold Blast Charcoal.....	25.00 @ 30.00. "
Bessemer Iron.....	23.50 @ 24.00. "

Ferromanganese.—There have been sales of several small lots of 80 % Ferro at \$97 @ \$98 at seaboard. Carnegie, Phipps & Co. are reported as having made a sale of domestic at \$105, Pittsburgh.

Muck Bar.—Continues very dull, and prices are weak and lower; there appears to be no demand. Consumers heretofore large buyers now appear to be able to make all they want. May be quoted at \$30.50 @ \$31, cash, with rumors that some sales have been made as low as \$30. Mills making a specialty of Skelp Iron are the large buyers of Muck; at present they are not running very strongly, but it is possible their business will commence to look up before long and as soon as it does there will be an improved demand for Muck.

Manufactured Iron.—There is a continued good demand for Merchant Iron, as well as the leading specialties, and prices are firm. For all kinds there has been an advance. Bars are quoted at 1.95¢ @ 2¢; Plates, 2.50¢ @ 2.60¢; No. 24 Sheet, 3¢ @ 3.10¢; Skelp Iron, 1.90¢ @ 1.95¢ for Grooved and 2.15¢ @ 2.25¢ for Sheared, all 60 days, with the usual discount of 2 % off for cash.

Nails.—There is not much doing at present, but an increased demand is looked for within the next few weeks, or as soon as the spring trade opens up. Wheeling is shipping large quantities South and West by river. No change in prices. Cut Steel Nails, \$2.50, 60 days, 2 % off, in car lots, and \$2.60 for less than a carload; Wire Nails \$2.85 @ \$2.90 in car lots, and \$3 for less than a car.

Wrought-Iron Pipe.—The demand for Pipe keeps up well for the season, and with the advent of spring the mills will soon have all they can get through with. Prices firm, but unchanged. Discounts on Black Butt-Welded Pipe, 50 %; on Galvanized do., 42½ %; on Black Lap-Welded, 62½ %; on Galvanized do., 50 %; Boiler Tubes, 1½-inch and smaller, 50 %; 2-inch and larger, 55 %; Casing, 5½-inch, 55 %. The regular monthly meeting of the Pipe Association takes place in New York this

week, but it is not expected that any change will be made in prices.

Old Rails.—There is very little inquiry in this market at present for Old Iron Rails; may be quoted in the absence of sales at \$28.50 @ \$29. Sales have been made to Mahoning Valley Mills within the past couple of weeks at \$29, delivered there, and \$29 appears to be the general price here for good lots. Old Steel Rails are steady at \$24 @ 24.50; there is more inquiry for Steel than Iron Rails in this market.

Steel Plates.—There is a good demand and prices are higher: Fire-Box, 4½¢ @ 4½¢; Flange, 3½¢; Shell, 3½¢; Tank, 2.90¢. Some good-sized contracts have been placed here within the past week and the indications are that there will be some more before long.

Blooms and Billets.—Prices are still unchanged and there appears to be no abatement in the demand; sales reported at \$36.75 @ \$37.50, according to size, quality, delivery, &c. Nail Slabs still quoted at \$36.50 @ \$37. It is said that a good many consumers of Blooms and Billets will make it a point to keep good stocks, from which it is evident that they do not anticipate any decline in prices.

Structural Iron.—There is a continued good demand and prices are firm, but the only change in prices is in Sheared Bridge Plates, which are higher. Angles, 2.45¢; Tees, 2.95¢; Channels, 3.10¢; Sheared Bridge Plates, 2.90¢; Universal Mill Plates, Iron, 2.55¢.

Wire Rods.—Are still reported firm at \$53 ¢ ton.

Steel Rails.—Are still quoted at \$35 @ \$36 here, with nearly all the business at \$35. It is evident that the mills both here and elsewhere are booking all the contracts they can get at present prices. Chicago quotes at \$37.

Merchant Steel.—There is a continued good demand, but there has been no recent change in prices: Tool Steel, 8¢ ¢ lb and upward; Crucible Spring Steel, 4¢; Crucible Machinery, 5¢; Open-Hearth Steel, 2½¢ @ 3¢; Bessemer Machinery Steel, 2½¢; Tire Steel, 2½¢.

Railway Track Supplies.—The demand continues light, as it nearly always is at this season of the year, but it is hoped that business will pick up next month. Prices remain unchanged. Spikes, \$2.15 here, and \$2.25 delivered at Chicago or St. Louis, 30 days; Splice Bars, 2.10¢ @ 2.20¢; Track Bolts, 3.10¢ with Square and 3.20¢ with Hexagon Nuts.

Old Material.—There is a continued fair business and prices are steady. No. 1 Railroad Shop Wrought Scrap, \$23 @ \$23.50, net ton; No. 1 Wrought Trim-mings, \$16; Car Axles, \$29 @ \$30; Cast Scrap, \$16.50, gross; Old Car-Wheels, \$20.50 @ \$21; Bessemer Steel Bloom and Rail Ends, \$25.50 @ \$26; Crucible Scrap Steel, \$29 @ \$30.

New York.

Office of *The Iron Age*, 46 and 68 Duane street, New York, January 22, 1890.

American Pig.—There has been no pressure to sell during the week, nor is the demand in any way urgent. The market is quiet, with No. 1 Foundry at \$20 @ \$20.50 and No. 2 Foundry at \$19 @ \$19.50. It is reported that in the West Bessemer Pig is selling at \$23 in the Valley, while in the East it is offered a little more freely. From abroad come reports of a further extraordinary advance in Coke, which is selling, delivered to the furnaces, at 40/ and upward, while Ore is up to 20/ and upward.

Spiegeleisen and Ferromanganese.—The sale of one large block for February and March shipment is reported at private

terms. Some importers quote Spiegeleisen 20 % at \$38 @ \$38.50, while others are willing to sell, up to October delivery, at prices equivalent to \$37.50 in ship. For Ferromanganese there is an active demand for small lots for immediate delivery. Futures are quoted at \$93 @ \$97.

Billets.—There is some inquiry, but the majority of the Eastern mills are not in a position to fill orders. Nominal quotations fluctuate between \$37 @ \$39.50 at mill.

Wire Rods.—Some activity is reported, one Eastern Rod mill having sold two lots of 1000 and one lot of 2000 tons to Eastern Wire works, at what is reported to be equivalent to \$56.50 New York. There is some inquiry for Foreign Basic Rods for re-export, for which \$59.50 has been asked.

Old Rails.—Old Rails continue scarce in this market, only relatively small quantities being available, among them one lot of 500 tons of Tees, for which \$28.50 is asked, and at which other small lots are offered, and a lot of 1500 tons of Doubles, for which \$29 is asked. Other parcels of Foreign Rails in store here are held at higher figures. Among the recent sales is one lot of 500 tons at \$29.50 of Tees, Philadelphia delivery, and one lot of 1000 tons of Doubles for shipment, same delivery, private terms.

Scrap Iron.—Among the sales reported this week is one lot of 500 tons of Choice Railroad Scrap at \$26, at point on the line of road in proximity to consumers' works.

Rail Fastenings.—There have been a few sales of Rail Fastenings for New England delivery. Angle Bars are now quoted \$2.15, delivered, while Spikes are nominally \$2.25, at mill.

Steel Rails.—Two of the Rail mills in Eastern Pennsylvania have marked up their price for Rails to \$36, at mill, but others are still selling at \$35, at mill, or its equivalent at least, to one of them, \$35.75, at tidewater. Sales during the week have not been large, aggregating about 10,000 tons. It is reported that there are some round lots in the market, so that it really appears that sellers during the prolonged spell of inactivity have been able to hold out better than buyers. The Board of Control report for the 1st of January shows that up to that date the total sales of Rails by the mills in the association, for delivery in 1890, aggregated 746,895 gross tons. It is the impression, however, that the sales really have been considerably larger, one authority insisting that they cannot be far from 1,000,000 gross tons, the allotment being 1,060,000 tons. The different mills sold and shipped during 1890 the following quantities of Steel Rails, of 50 lb ¢ yard and upward, as reported to the Board of Control. We have added the figures for 1888 by way of comparison:

Steel Rails Sold and Shipped, Fifty Pounds and Upward, for 1888 and 1889.

	1888. Gross tons.	1889. Gross tons.
North Chicago.....	161,945	.....
Union.....	126,016	.....
Joliet.....	114,675	.....
Illinois Steel Co.....	402,636	401,795
Carnegie Bros. & Co.....	138,946	267,461
Scranton Steel Co.....	136,029	155,814
Lackawanna Coal and Iron Co.....	128,310	139,141
Bethlehem Iron Co.....	85,448	121,262
Pennsylvania Steel Co...	121,960	105,931
Cambria Iron Co.....	82,363	64,947
Cleveland Rolling Mill Co.....	29,940	14,807
Troy Steel and Iron Co...	25,110	2,280
Western Steel Co.....	39, 68	.....
Worcester Steel Co.....	6,569	.....
Springfield Iron Co.....	3,705	.....
Totals.....	1,200,184	1,271,438

It will be understood that these totals in both years do not include Light Rails, of which some of the mills make considerable quantities, while others make none. It should be stated, too, that for the year 1889 the Allegheny Bessemer Steel Company, at Pittsburgh, is not included. They probably added about 75,000 tons to the make. The figures are interesting, as showing how the trade has narrowed down practically to three groups of mills—the Chicago mills, now under one management; the Carnegie, Allegheny and Cambria, in Western Pennsylvania, and the Scranton, Pennsylvania, Bethlehem and Lackawana, in Eastern Pennsylvania. It will be observed that the principal gains in 1889 have been made by Carnegie, Scranton and Bethlehem.

Financial.

Among current events financial matters in and out of Congress have a prominent place. Banking legislation with reference to perpetuating the present currency system, the silver problem and the reported purchase by the Bank of silver bullion to be used as a basis for the issue of £1 notes, afterward pronounced "improbable," all these form common topics of conversation and have an unsettling effect. The rumors from London received some support from the fact that there have been heavy exportations of silver to England of late, and it is known furthermore that on account of the enormous absorption of capital in floating new enterprises during 1889 there are no adequate means of replenishing the gold supply. Bar silver in London was weaker at 44½d. ¢ ounce. The price in New York declined to 96½ in sympathy. The movement against trusts by various State governments is taken up in the Massachusetts Legislature under instructions from the Attorney-General, who proposes to test the validity of such combinations, and in Missouri proceedings have been instituted against the Simmons Hardware Company, under the Anti-Trust law. Touching the Reading imbroglio Philadelphia reports indicate a determination on the part of members of the Poughkeepsie Bridge Company to have Mr. Corbin's election declared invalid. The crusade is said to have for its motive the control of the Reading in the interest of the bridge system. It is estimated that New England consumes 5,000,000 tons of anthracite coal and 3,000,000 tons of bituminous coal annually. If it can be arranged that the Reading shall supply the bulk of the anthracite so consumed and the bridge company can obtain revenue from the tariff thus created, both corporations would share in the benefits. The first train over the Arthur Kill Bridge to Staten Island was run on Monday morning. Unprecedented snow storms on the Pacific Coast have suspended railway communication with San Francisco, and half the cattle in Nevada are reported to have perished. The effects will be prejudicial to trade for some time to come.

The stock market has been dull, with a downward tendency. This is most noticeable in the coalers, on account of the depressed condition of trade. London did little in this market. Trust stocks were irregular. American cotton oil on Saturday touched about the lowest point yet reached, on account of reported difficulties in the reorganization. On Monday Union Pacific ranged higher on favorable earnings for last December and Boston purchases. On Tuesday stocks were more active, and a fractional advance was made in the general list, with a sharp rise in specialties. Government four per cents fell 1 % on Secretary Windom's resolution not to accept any further offerings of that class of bonds for the present.

United States bonds are quoted as follows:

U. S. 4s, 1891, registered.....	104½
U. S. 4s, 1891, coupon.....	104½
U. S. 4s, 1907, registered.....	125
U. S. 4s, 1907, coupon.....	125¼
U. S. currency 6s, 1895.....	116

Secretary Windom on Monday announced that he has decided to suspend the purchase of the 4% bonds until further notice, continuing the purchase of the 4½% bonds as heretofore. The reason given for this is that the heavy purchases of bonds during the past week have reduced the available surplus below \$20,000,000. Secretary Windom says that the suspension of purchases of 4s will be but temporary, until the surplus again begins to accumulate. The amount of currency now out is about \$39,000,000, represented by about \$36,000,000 in bonds. About \$27,000,000 of this is in 4s. The Secretary proposes, therefore, to withdraw only about \$21,000,000 more. The amount of bonds surrendered to date is about \$9,000,000.

The weekly statement of the Associated Banks showed an increase of \$1,765,425 in the amount of surplus reserve, which is now \$7,774,125. In loans there was an expansion amounting to \$3,214,400. Specie increased \$1,704,200 and legal tenders \$1,436,900. Deposits increased \$5,502,700. Money is in good supply and practically on borrowers' terms, but thus far there is no revival of the speculative spirit. The prevailing ease was largely due to Government disbursements in the purchase of bonds. Time money loaned on good collateral ruled at 5% for four months. Where mixed collateral was offered the rate for three to four months was 5½ to 6%. There was a good supply of commercial paper, with a fair demand at about previous rates. The capital stock of \$100,000 of a new State bank in New York City, to be known as the Canal Street Bank, has been fully subscribed. Postmaster Van Cott was elected president of the West Side Savings Bank.

The market for foreign exchange was steady, but very dull. The rates for actual business were \$4.82½ @ \$4.86½.

The export movement of general merchandise has been active, but there is a lull just now, and rates for ocean freight are slightly off, particularly for February and March. There is little foreign demand for wheat, the United Kingdom apparently ignoring this market. Some of the Minneapolis flour mills have shut down because the foreign markets are glutted with low-grade flour. Corn is a fraction lower, but fairly active for spot. Coffee prices are stronger. The Brazil crop is generally estimated at 6,250,000 bags. Cotton was 1½¢ higher, with large sales. Sugar is steady. A very singular feature in the present situation is that refined sugar in Montreal is selling for less than the raw article in New York. A fairly bright refined sugar sold there recently at 5½¢ in round quantities. The export of hog products continues large.

The Brazilian Government has issued a decree dividing the country into three districts and providing for three issue banks, with a capital of \$250,000,000 in Government stock, the circulation of each bank's notes to be confined to its own district. Ten % of the earnings will be applied to the redemption of the capital stock.

The exports of breadstuffs, provisions, cotton and petroleum for December amounted to \$74,000,000, against \$67,000,000 in 1888 and \$54,545,197 in 1887, and for the year 1889 the increase over the previous year was \$101,000,000.

The total exports from Mexico for the fiscal year ended June 30, 1889, as shown by the Treasury statistics just made public, amounted to \$60,158,423, as against \$48,885,908 in the previous fiscal year.

The gain over the previous fiscal year was in precious metals \$7,779,087 and in merchandise \$3,493,427. The United States and England took 88.7 in 1888-9, against 85 in the previous year.

Exports from New York for the week were valued at \$8,419,700. Total since January 1, \$27,644,000, as compared with \$30,288,000 for the same time last year. Exports for the week amounted to \$7,456,000, and since January 1 the total is \$19,346,000, as against \$20,614,000 for the same time last year.

Metal Market.

Copper.—The cable quotation from London at the time of our last week's report was £50 spot and £50. 15/ futures; it is respectively £49. 2/6 and 49. 15/ to-day, the amount of sales over there during the interval having been 1190 tons. While consumption on this side is reported to be going on at a fair rate, there has been less doing in the way of sales, most consumers being amply stocked for some time to come. A few lots available outside of the mining companies have still gone at 14½¢ Lake, the latter asking 15¢. We quote Arizona 13½¢ @ 13½¢, and casting brands 13¢ @ 13½¢. At the close not over 14½¢ @ 14½¢ is bid for Lake Copper on the spot.

Tin.—The London quotation a week ago was £94. 2/6, spot, and £95, futures; it is respectively to-day £94 and £95, sales meanwhile aggregating 790 tons. Some 200 tons were sold in this market at a decline of 1¢ 10/16 from last week's closing quotation for spot and futures, recovered toward the close, the former being 20½¢ @ 20½¢ to-day. **Tin Plates.**—There has been but a moderate demand on the spot, met by dealers at rates slightly below the price of importation; but it has been different with futures, which cannot be had at anything less than the equivalent of what the present ruling is on the other side. We quote at the close, per box: Siemens-Martin Steel, Charcoal finish, \$5.50 @ \$6; Coke finish, \$5.20 @ \$5.25; Coke Tins, Penlan grade, \$4.75 @ \$4.80; J. B. grade, \$4.85 @ \$4.90, and Wasters, \$4.70.

Lead.—Sales were confined to some 250 tons Common Domestic at 3.87½¢. To-day there would be plenty of buyers at 3.85¢, but the asking figure remains unaltered, 3.87½¢. St. Louis has been moderately active at 3.60¢.

Spelter.—There has been practically no business done since our last report except in a very small way at 5.35¢ @ 5.40¢, which is the nominal closing quotation on a flat market. Silesian gave way 2/6 in London and is 7½¢ nominally here. At Breslau the Silesian Godulla brand has been sold at 47.20 marks @ 100 kg. for delivery during the second quarter; near futures are correspondingly higher, at 48 marks good ordinary, January-February delivery. The Vieille Montagne Company have raised their price of Sheet Zinc to 62 francs @ 100 kg.

Antimony.—A fair jobbing demand has prevailed. We quote Cookson's 30¢ and Hallett's 21¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, January 16.	
10 tons Tin, January.....	20.40¢
50 tons Tin, January, afloat.....	20.45¢
FRIDAY, January 17.	
10 tons Tin, April.....	20.50¢
10 tons Tin, May.....	20.50¢
20 tons Tin, May.....	20.55¢
MONDAY, January 20.	
35 tons Tin, Spot.....	20.55¢
TUESDAY, January 21.	
100 tons Iron, February.....	\$18.37½¢
10 tons Tin, February.....	20.70¢
10 tons Tin, March.....	20.70¢
10 tons Tin, April.....	20.75¢

Coal Market.

A reminder of zero weather imparts, at least temporarily, a more cheerful tone to the market for Anthracite Coal. But the period of depression has been protracted too long, and the accumulations of surplus stock at shipping points are too large to permit hopes of a radical improvement for some time to come. Perhaps presuming on the advent of winter weather the Coal operators have permitted themselves to mine more freely during the week just closed, but as numerous collieries are shutting down, a final spurt in anticipation if this resort was natural. A further shut down of Anthracite mines this week is predicted, owing to the fact that storage facilities are pretty well exhausted, and because cars are loaded up at all points, absorbing the means of transportation. The accumulation of stocks at distributing points is unprecedented. According to one statement 11,000 cars out of 20,000 in the service are sidetracked.

John H. Jones, Chief of Bureau of Anthracite Coal Statistics, furnishes the following statement of Anthracite Coal production for the year 1889, compared with 1888:

Region.	1889. Tons.	1888. Tons.	Difference. Tons.
Wyoming.....	18,647,925	21,852,365	Dec. 3,204,440
Lehigh.....	6,285,420	5,639,236	Inc. 646,184
Schuylkill.....	10,474,364	10,654,116	Dec. 179,752

Totals... 35,407,710 38,145,718 Dec. 2,738,007

The stock of coal on hand at tidewater shipping points December 31, 1889, was 1,026,107 tons; on November 30, 1889, 771,334 tons; increase, 254,773 tons. The amount on hand December 31, 1888, was 652,156 tons. Shipments of Anthracite Coal for the week ending January 11, 1890, amount to 495,904 tons, an increase of 50,000 tons compared with the previous week and making an aggregate since the 1st inst. of 941,806 tons, as compared with 1,042,505 tons for the same time in 1889, a decrease of 100,699 tons.

It is stated that the Reading Company have taken the contract to supply the Philadelphia water-works with 66,000 tons of Pea Coal at \$2.03 @ ton. The tolls on Pea Coal from the mines to Philadelphia are \$1.40 @ ton, so this contract nets 63¢ at the mines. A Pottsville correspondent referring to Mr. Corbin's success in obtaining the Manhattan Elevated contract by underbidding the Lehigh Valley says this policy of cutting prices will be continued and that a number of new contracts in Boston, New York and Philadelphia will be announced in a few days. The writer says: "This cutting of rates by the leading producing companies is being followed by all classes of wholesale dealers until the circular rates amount to nothing. The card prices remain the same as the lowest of last summer, but they are being shaded in a remarkable way, the price being lower than ever before. Yet, in spite of all this, the retail figures generally remain as high as ever, with few exceptions. This is true not only in the retail markets of leading cities, but within ten miles of the mines. In steam and manufacturing sizes and furnace Coal trade continues very brisk, and the same may be said of Soft Coal. Prices are high and firm and will continue so as long as the Iron trade is brisk. Freight rates on Coal and iron have been advanced this year by the Reading Company about 15%, so that tolls are now what they were last year, when a dull iron trade induced Mr. Corbin to lower the rates."

Bituminous Coal is being mined freely, so that an easier market is predicted, but the companies speak of difficulty in filling contracts, so that spot cargoes are in demand. Cumberland reports shipments of 107,528 tons for the year to January 11, and Clearfield for the week 75,197 tons; Pocahontas 41,000 tons; Beech Creek

35,555 tons, indicating a heavy movement. Quotations are \$3.25, f.o.b. A Coal vein $4\frac{1}{2}$ feet thick and of a quality that is rarely excelled in the Western country has been discovered at Vincennes, Ind.

Imports.

Hardware, Machinery, &c.

Alenquist, A. W., Mach'y, cs., 50
Boker, Hermann & Co., Arms, cs., 41 Chains, cks., 21
Downing, R. F. & Co., Mach'y, pgs., 4
Folsom, H. & D. Arms Co., Arms, cs., 7
Henderson Bros., Nails, kegs, 30
Larrey, Grosvenor, Mach'y, cs., 7
Overman & Schroeder, Mach'y, pgs., 49
Overton & Co., Mach'y, pgs., 25
Pim, Forwood & Co., Nails, kegs, 60
Rose, A. C., Mach'y, pgs., 49
Sumner, C. P., Mach'y, pgs., 68
Sacks & Richmond Nails, cks., 14
Shattuck & Binger, Mach'y, pgs., 13
Schoverling, Daly & Gales, Arms, cs., 5
The Morgan Engineering Co., Mach'y, pcs. and pgs., 20
Uhlmann, St. F., Mach'y, pgs., 6
United States Butter Extract Company, Cast-ings, pgs., 18
Wiebusch & Hilger, Chains, cks., 26
Order—Hardware, cs., 1; Mach'y, pgs., 22

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, January 22, 1890.

The speculation in Pig Iron warrants has been quieter and prices have fluctuated within narrower limits except in the instance of Middlesborough, which dropped to 57/6. Realizations have been quite general, under the influence of smaller trade demand, dullness in freights together with likelihood of the restarting of a number of idle furnaces. The speculation in warrants on the London Metal Exchange is proving satisfactory in volume. Makers' brands of Scotch Pig, with few exceptions, are very firmly held, despite the lower prices for warrants, but Middlesborough and Bessemer Pig have been sold at a decline. Spiegeleisen is held at 5/ advance.

Block Tin continued weak under the weight of offerings of quite large quantities of forwards pressed for sale, which buyers were willing to take only at a further reduction in price. Cash lots have latterly been disposed of by holders anxious to realize, some of whom replaced their sales by purchases for distant delivery. The latter transactions have caused a wider difference between cash and futures the past few days. At the close the market is firmer but quiet.

Copper has further declined and a moderate business in Merchant Bar warrants is about all that has been done. It is understood that there have been purchases during the past three weeks about 5000 tons of French holdings. This has tended to make a pause in speculation, but desire to realize has been the chief cause of the downward movement of prices. Chili charters are advised as 800 tons for the fortnight. The new supply was 9700 tons; 9900 tons the corresponding period last year. The arrivals from the States were equal to 1300 tons fine Copper; from France none. The Matte Copper now coming forward is chiefly that obtained by the Anaconda Company from the Chambers group of mines, and there is at present some scarcity of furnace material. Smelters are therefore taking Chili Bars in its place at the reduced prices.

In Tin Plate there has been little business, but sellers' prices for all sorts are

maintained. The stocks at British shipping ports amount to about 469,000 boxes, against 308,000 boxes a year ago.

Sellers of old material are very firm and assert that difficulty is experienced in securing supplies. Holders ask about 10/ advance on both Old Rails and Wrought Scrap.

Scotch Pig.—There is a fairly active demand for best brands and prices for the same are very firmly held.

No. 1 Coitness, f.o.b. Glasgow	80/6
No. 1 Summerlee, " "	79/
No. 1 Gartsherrie, " "	78/6
No. 1 Langloan, " "	78/6
No. 1 Carnbroe, " "	64/
No. 1 Shotts, " at Leith	80/6
No. 1 Glengarnock, " Ardrossan	78/
No. 1 Dalmeilington, " "	71/
No. 1 Eghinton, " "	64/6

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.

Cleveland Pig.—Business has been moderate and prices are irregular. Makers quote No. 3 Middlesborough at 60/ for prompt.

Bessemer Pig.—Transactions have been active but at irregular and slightly lower prices. West Coast brands, mixed numbers, now quoted at 82/, f.o.b. shipping point.

Spiegeleisen.—The demand continues brisk. Supplies moderate and holders asking higher prices. English 20 % quoted 135/, f.o.b. at works.

Steel Rails.—Prices are well maintained and makers report a good demand. Heavy sections quoted at £7. 5/ and light sections £7. 12/6 @ £8, f.o.b. at N. W. England shipping point.

Steel Blooms.—The demand is fairly active and prices are firm. We quote £6. 17/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—There is still quite a good business doing, but prices are a little irregular. Bessemer, 2 $\frac{1}{2}$ x 2 $\frac{1}{2}$ inch, £7, f.o.b. at N. W. England shipping point.

Steel Slabs.—The demand fairly active and prices firm. Bessemer, £7, f.o.b. at N. W. England shipping point.

Old Rails.—Light stocks restrict business. Holders ask higher prices. Tees quoted at £4. @ £4. 2/6, and Double-Heads, £4. 5/ @ £4. 10/, f.o.b.

Scrap Iron.—Holders ask 10/ advance. Little business doing. Heavy Wrought quoted £3. 10/ @ £3. 11/.

Crop Ends.—The market quiet and prices unchanged. Bessemer quoted £3. 12/6 @ £3. 15/, f.o.b.

Tin Plate.—Trade has been rather slow and prices are without important change. We quote, f.o.b. Liverpool:

1C Charcoal, Alloway grade	17/6 @	17/6 @
1C Bessemer Steel, Coke finish	16/6 @	16/6 @
1C Siemens	16/9 @	17/
1C Coke, B. V. grade	16/ @	16/3 @
Charcoal Terne, Dean grade	14/6 @	15/

Manufactured Iron.—Transactions have been moderate, but the market is firm, and 5/ advance is quoted on Common Bars and Black Sheets. We quote, f.o.b. Liverpool:

Staff, Marked Bars	10	0	0	0	0	0
" Common	9	0	0	0	9	5
Staff, Bl'k Sheet, singles	0	0	0	0	11	0
Welsh Bars (f.o.b. Wales)	8	7	6	0	8	12

Copper.—Demand fairly active, prices about steady. Chili Bars quoted at £49, spot, and £49. 12/6, three months' futures. Best Selected, £57.

Tin.—Only slight variation on spot, but futures firmer. Business fair. Straits quoted at £94, spot, and £94. 17/6 for three months' futures.

Spelter.—The market quiet and a shade easier. Quoted at £24. 7/6 for Ordinary Silesian.

Lead.—Only a moderate business and prices rather lower. Quoted at £13. 10/ for Soft Spanish.

MARKETS BY TELEGRAPH.

WEDNESDAY AFTERNOON.

Pittsburgh.

Pig Iron is dull and weaker. Forge Irons are being offered from the East at \$17.75, cash, delivered in Pittsburgh. City furnaces are well sold up and are not making any offers to sell. Bessemer Pig is offering at \$23.50, cash, Pittsburgh, and might be had at \$23, cash. The *Bulletin* of the Western Iron Association shows that there was an increase in stock in first hands during December of about 26,000 tons. It is but proper to state that a good deal of this increase is sold and will be placed on firmer contracts as soon as transportation can be obtained. Muck Bar very dull, offering at \$30.50, cash, and it is thought an offer of \$30 would be accepted. No demand for Old Iron Rails in this market. Old Steel Rails scarce and in demand. It is said that the Illinois Steel Company have cleared the Western markets. Bessemer Steel Billets continue very firm, with a good deal of inquiry, and mills generally oversold. Sales at \$37.50, cash, on cars at Wheeling, to go East. The Wrought Iron Pipe Association hold their monthly meeting in New York Thursday.

Cleveland.

There is no change in the Pig-Iron situation beyond an improved demand for No. 1 Foundry. Non-Bessemer Ore sales for the first three days of the week probably aggregate 20,000 tons.

Chicago.

Notwithstanding offers of speculative lots the Pig Iron market maintains a firm undertone. A better demand has been developing latterly and dealers have been agreeably surprised by buyers closing for considerable quantities which have been under negotiation. They claim that they have not been obliged to cut prices to secure these orders, hence are inclined to view the efforts of speculators to unload with indifference. The quantity of Iron thus available has been unduly magnified by the same lot being offered by several brokers. Old Iron Rails are weaker, but no transactions have taken place to fix prices. The best bid now is \$26, but some consumers look for a greater decline. Bar Iron is in good demand and prices seem to have touched bottom for the present. Nothing new has developed in Nails or Barb Wire. Extreme cold weather now prevails throughout the West, and if it continues will very favorably affect general business.

St. Louis.

Pig Iron remains in about the same position as noted in last report. There have been no sales of any consequence, although at the moment prices can be regarded as somewhat firmer than a week or ten days ago.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	41.08
Milreis (Brasil).....	54.6
Mark (Germany).....	23.8
Kilogram.....	Pounds
Picul.....	2.206
	134.

EAST INDIES.

COLOMBO, CEYLON, November 28, 1889.—*Plumbago*—Has been moderately active, without change in prices. We quote at the close, in rupees $\frac{1}{2}$ ton: Large Lumps, 220 @ 250; Ordinary Lumps, 200 @ 230; Chips, 115 @ 135, and Dust, 55 @ 100. Since October 1 shipments to the United States have been on a vast scale, being 81,009 cwt., against 22,209 same time last year. They have been otherwise distributed as follows: To England, 21,602; to Hamburg, 600; to Antwerp, 589; and to Bremen, 368; together 104,160 cwt., against 39,141 same time last year, 46,924 in 1887 and 37,365 in 1886. *Exchange*.—Six months' sight on London, 1/5 5-16.—*Volkart Bros., Ceylon and Malabar Coast, through their agent in New York, Mr. John W. Greene, 82 Wall street*

MANILA, January 13, 1890.—*Hemp*—Has been steady. We quote, $\frac{1}{2}$ picul, \$14.50, against \$15.50 same date last year, equaling $\frac{1}{2}$ ton, cost and freight, £46. 5/, against £53. 2/6. Since last cable there have been no clearances for the United States, against 12,000 bales same week in 1889. Since January 1 they were 15,000, against 20,000; loading for ditto, none, against 23,000. Cleared for England since January 1, 13,000, against 6000, loading for ditto, none, against 3000. Cleared for all other ports, 1000, against 1000. Receipts at all ports since last cable, 8,000 bales, against 12,000, and since January 1, 8,000 bales, against 19,000 in 1889 and 13,000 in 1888. *Freight*—\$5, against \$7.50. *Exchange*.—Six months' sight, 3/5 $\frac{1}{4}$, against 3/8 $\frac{1}{4}$.—*Ker & Co., per cable direct to their agent in New York, Mr. Charles Nordhaus, 89 Water street*

HOLLAND.

ROTTERDAM, January 2, 1890.—*Tin*.—The next auction of Billiton Tin at Batavia, Java, of 13,000 piculs is to come off on February 25 next.

—The following statement shows the position of Banca Tin in Holland on the 30th of December from the official returns published by the Dutch Trading company:

	1889.	1888.
	Slabs.	Slabs.
Import in December.....	8,000	22,000
Total 12 months.....	160,447	202,623
Deliveries in November.....	10,700	10,400
Total 12 months.....	152,314	129,217
Stock, second hand.....	21,083	27,400
Unsold stock.....	152,311	137,861
Total stock.....	173,394	165,261
Afloat, piculs.....	1,000	3,000
<i>Statement of Billiton.</i>		
	1889.	1888.
	Slabs.	Slabs.
Import in December.....	8,375	13,800
Total 12 months.....	104,038	92,421
Deliveries in November.....	6,583	7,033
Total 12 months.....	92,831	86,751
Stock.....	30,507	20,798
Afloat.....	22,000	17,500
Quotation 30th December, Banca.....	fl. 59 $\frac{1}{4}$	fl. 60
Quotation 30th December, Billiton.....	fl. 58 $\frac{1}{4}$	fl. 59 $\frac{1}{4}$

Export of Tin from Holland.

	Ten months.		
	1889.	1888.	1887.
	Tons.	Tons.	Tons.
To Germany.....	5,294	5,444	4,524
To England.....	141	149	169
To Belgium.....	804	700	794
To France.....	244	362	334
To Hamburg.....	443	334	509
To the United States.....	387	358	466
To other countries... ..	511	605	772
Totals.....	7,824	7,952	7,568

—*De Monchy & Havelaar.*

AUSTRALIA.

SYDNEY, N. S. W., November 15, 1889.—*Locomotives*.—The Secretary of the Treasury of the colony invites some experienced Locomotive builder abroad to establish a factory on the spot. He estimates the outlay at \$600,000. The Colonial Government, he states, to be ready to make a contract for 100 Locomotives

to be delivered three years hence, provided the difference is not too great between them and those that can be procured elsewhere. He adds that a factory of the kind would virtually enjoy a monopoly.—*Argus.*

SPAIN

BILBAO, December 28, 1889.—*Iron Ore*.—Only a few important dealings have transpired. Quotations have nevertheless remained firmly sustained at 10/3 @ 11/ Campanil, and 8/6 @ 8/10 Rubios. There are steamers in port awaiting cargo of a joint capacity of 155,000 tons. In spite of poor weather and the holidays there have been cleared during the week for abroad 92,669 tons. Total shipments thus far in 1889: 3,854,635 tons, against 3,580,425 in 1888, and 4,170,422 in 1887. *Pig-iron*.—Export 1510 tons, coastwise 1161 tons.—*Bilbao Maritimo y Comercial.*

BELGIUM.

BRUSSELS, January 11, 1890.—*Iron*.—Belgian Iron trade seldom revives before the middle of January. Iron masters are uneasy about the supply of fuel, especially in those districts where there are strikes of miners, like, for example, in the Charleroi basin. Fortunately the other districts are quiet, and some trust that in a week or two everything will be running smoothly again throughout the country.—*Moniteur des Interets Materiels.*

Iron in the Construction of Buildings.

Without question, says a Western exchange, the timber trade is beginning to seriously feel the loss of demand resulting from the use of iron in the construction of buildings. By this it is not meant to imply that there is less demand for timber and joists than there was before iron came so extensively into use, but that heavy dealers in such stuff are failing to realize such increase of demand for wood interiors as they had counted on as the result of the rapid growth of the larger cities. They still have left as a resource the growing demand for the lighter and shorter timbers and joists, such as enter into the construction of smaller business and residence houses in the outlying districts of the larger cities, and in all interior places. But in the immense warehouses and office buildings that are being so numerous erected in the great cities iron and steel are being mostly used as supports for floors and interior work. The growth of the demand for structural iron has been rapid within the past three years, and lumber dealers are beginning to comment on it as if it was a serious matter. It changes the nature of the requirement for timber and joists, there now being proportionately less long and heavy stuff called for than formerly, such demand as there is being cut into by the increasing use of yellow pine for certain classes of heavy freight warehouses and large manufacturing structures. The present flourishing condition of the iron trade and the ore market, in a season when there is certainly no remarkable extent of railroad construction going forward, is attributed to the demand for structural iron. If the requirement has so remarkably increased within the recent past that it can absorb the greatly enhanced output of mines and mills, supplemented as it has been by the late development of mineral wealth in the South and in the newer Lake Superior districts, what may we expect for the coming decade? The use of structural iron has but just acquired full headway. We may safely predict that in the near future not only will the larger, costlier structures require iron, but it will be employed in the medium class of business houses as well. The tendency of recent architecture is to strength, solidity of appearance and ability to resist decay and destruction by fire. Investors are building more for the future than they did in the past. As wealth increases and interest on money diminishes in rate per cent., the tendency is to permanently invest in enduring structures that will con-

tinue as a means of preserving capital and securing income for generations to come. This leads men to seek an enduring building material, and iron answers the purpose. For this reason we may expect to see the demand for structural iron increase and that for wood correspondingly decrease. But this observation, in its reference to wood, applies only to timber and joists in the cities. In country towns wood will be used as long as the supply shall last and all finishing will continue to be done in wood. So there will be a demand for the product of the mines and the forests, but iron will work a change in that for the coarser product of the saw mills by cutting off a measure of the requirement for timber and joists of the heavier class.

Among the latest bridge building schemes is one for bridging the Dardanelles and thereby uniting the European with the Asiatic shore. This is a feat that has not been attempted since the days when a great storm destroyed the bridge of boats which Xerxes had cast across the Hellespont for the passage of his army. It is stated that the plans for the new bridge have already been drawn up, and that they are now being considered by the Sublime Porte. The distance between the Asiatic and European shores does not exceed a mile and a quarter, and the chief engineering difficulties are due to the extreme rapidity of the currents.

The value of trade schools is emphasized in the annual report of the Elmira Reformatory. The managers say: "The trade schools have also proved a most valuable feature of the reformatory, both for fitting the inmates to earn a living when they go out and for interesting them and calling into play all their resources. 'Observing the advantage and inspiration to prisoners of good trade instruction,' says the superintendent, 'I am amazed that it is so neglected in prisons generally; it is an indispensable element of any reformatory system, both for the aid of easily satisfying wants and also for the inspiration of it.'"

Brazil's new rulers have issued three decrees, the first naming September 15, 1890, as the day when a general election for delegates to the Constituent Assembly shall be held, and November 15, 1890, the anniversary of the overthrow of the empire, as the date of the assembling in Rio de Janeiro of the convention. The second decree banishes the imperial family and revokes the gift to the ex-Emperor and the continuance of the annual pension. The third decree banishes the late Prime Minister, Affonso Celso, Sr., Visconde Ouro Preto and his son, and exiles Silveira Martins, of Rio Grande do Sul. The constitution being prepared by the commission organized therefor will be conformed as nearly as possible to that of the United States.

The new State prison, to cost \$888,000, will be located in Esopus, Ulster County, 85 miles from New York, on the West Shore Railway.

A London cable states that the firm of Armstrongs, gunmakers, intend to establish an immense shipyard in the United States and bid, through Americans interested in the enterprise, for the construction of the ironclad vessels which it is proposed to build for the United States Navy. The claim is made by the Armstrongs that they can profitably compete with the American shipbuilders on their own ground and easily command the American influence necessary to secure contracts.

continue the business under the old firm name. John T. West is of the well known firm of W. H. West & Bro., brickmakers, and C. H. Rudolph was for 15 years connected with W. J. H. Gluck's establishment in Baltimore, Md. The new firm proposes to enlarge the business and to carry an exceptionally complete stock.

The Bridgeport Steel Cutting Company, Bridgeport, Conn., in their advertisement on page 78 call attention to the Fox Adjustable Try and Bevel Square, an illustration of which is given. The advantages possessed by this tool are also alluded to.

Paine, Diehl & Co., Philadelphia, are directing special attention this season to their Keystone Ice Cream Freezer in connection with their Keystone Whip and Mixer, as referred to in their advertisement on page 92. The Keystone Whip and Mixer is widely known to the trade, having had a very large sale during the past few years, but it was not until late last season that it was offered in combination with the Freezer, so that it is both Freezer and Mixer. The manufacturers emphasize the efficiency of its working as a Freezer, stating that the fact that the beater is such a perfect mixer first suggested the idea of the Freezer, as by it the water and fat of the cream are thoroughly mixed, so that in freezing the water does not take on its regular form when frozen of crystals, but gives a perfectly smooth and fine cream. They allude also to the comparatively little labor involved in freezing, emphasizing one of the novel features of this article, that the operator can watch the process and see the cream freezing, which is alluded to as occupying the mind and diverting the attention from the mere labor of the operation, making it interesting instead of being as it usually is dull work. The character of the workmanship and the great advantages given in selling, from the fact that Freezer, Mixer and cooking-book are offered at a very moderate price, are also alluded to.

Braunsdorf & Gerstner, 634 Eighth avenue, New York, have prepared a very convenient memorandum book which they are distributing to their customers. It is bound in leather and gives a view of their well-known store, calling particular attention to the specialties which they handle. A calendar for 1890 is contained in it and also some tables in regard to the approximate number of Nails per pound.

Pratt & Letchworth, Buffalo, N. Y., have issued a very neat calendar for January, in which attention is called to the manufactures of the company, reference being made to their Buffalo Malleable Iron Works, Buffalo Saddlery Hardware Works, Buffalo Wood Hame Works, Buffalo Steel Foundry, Buffalo Grey Iron Works, Buffalo Brass Foundry and Buffalo Toy Works, of which they are proprietors.

Cycloleum is the very suggestive and appropriate name of a new oil prepared expressly for Horton, Gilmore, McWilliams & Co., of Chicago, and designed for lubricating bicycles, sewing machines and any other fine machinery. It is put up in bottles of convenient size, neatly labeled.

Erie Specialty Mfg. Company, Erie, Pa., have issued their new catalogue showing the line of goods which they are putting on the market the present season. It describes a very complete and attractive line of Corkscrews, Lemon-Squeezers, Ice Shaves, Milk Shakes, &c., and among them we observe some new patterns. Improvements have also been made in some of the goods which were on the market last year.

Chattanooga Plow Company, Chattanooga, Tenn., issue a catalogue describing their patent Chilled Plows. Special attention is called to the merits of these

goods, reference being made especially to the interchangeable handles and beams; the fact that the standard is fastened to the beam and the share fastened to the standard with two bolts; that patent steel bolts, which will not turn when tightened or loosened, are used, and that there is only one size and length of interchangeable bolts in all plow bases. A full description is also given of the construction of these Plows. Their Double Shovel Plows and Folding Scotch Harrows and Cane Mills are also represented.

Among the advertisements on page 53 is one signed "Western," in which a well-known jobbing house announce their desire to secure a salesman for Machinery, Supplies and Steam Fittings to travel for them in Ohio and Indiana. They want a first-class well-posted man. Their position in the trade renders this a desirable opening for those who are competent to fill the place.

Joseph Churchyard's Sons, 642-654 Clinton street, Buffalo, N. Y., have issued a new catalogue bearing date 1890, in which their well-known line of Refrigerators, Ice Chests and Bellows is illustrated. In regard to Refrigerators they state that they have made some further improvements in construction and have added new sizes, thus giving an extensive line that will be satisfactory to the trade. The catalogue is effectively printed.

Waltham Watch Tool Mfg. Company, Waltham, Mass., issue a circular relating to infringements on their patents on the Waltham Key Holder and warning the trade against the same.

Grand Rapids Refrigerator Company, Grand Rapids, Mich., have issued their catalogue and price-list for the season of 1890. It is devoted principally to the well-known Leonard Dry Air Cleanable Refrigerators, of which illustrations are given, with a detailed explanation of their construction. Some new and attractive patterns are represented. They also show separately a line of Sideboard Tops. The Leonard Cleanable Creameries are also represented and their Portable Stormhouses. Ironing Tables, Boston Boards, Ironing Boards, Meat Blocks, Quilting Frames, Scouring Boxes, Folding Washbenches and Shelf Brackets are also illustrated. The catalogue is handsomely printed and is very satisfactory in its arrangement. They also have a line of lithographed cards, in which in an entertaining way attention is called to the merits of their different manufactures.

Announcement is made that the partnership heretofore existing between S. J. Frasse, A. H. Briggs and T. S. Wells, under the firm name of Frasse & Co., expired December 31, by limitation. H. F. Frasse, A. H. Briggs and S. J. Frasse have formed a new partnership under the same firm name and will continue the business at the old stand, 92 Park row, New York.

Wiebusch & Hilger, 84 and 86 Chambers street, New York, have issued a new and attractive illustrated catalogue and price-list representing the line of American, German, English and French Hardware and Cutlery, Guns and Gun Material, Chain, Anvils, &c., which they are handling as agents, manufacturers and importers. A list is given of their foreign and domestic agencies and also the special lines of foreign and domestic goods in which they deal. The list will be found convenient and serviceable.

Grand Rapids Mfg. Company, Grand Rapids, Mich., have issued their illustrated catalogue for the present year. It contains descriptions of the line of Farm Machinery, Tools, Fixtures, &c., of which they are manufacturers. It thus relates to

Plows in extensive variety, Land Rollers, Cultivators, Harrows, Cutting Boxes, Hay Tedders, &c. It is also stated that their assortment embraces many tools not shown in the catalogue, but pamphlets, circulars, &c., relating to other machines and implements will be sent on application.

American Cutlery Company, Chicago, Ill., have a very convenient and effective letter opener which they are sending to their customers. It is of steel, with a neat handle, and is admirable adapted to the purpose for which it is intended.

The Yale & Towne Mfg. Company, Stamford, Conn., and 84 Chambers, New York, have prepared a convenient and attractive paper weight in which the Bower-Barff rustless finish is used.

The creditors of Lyons-Thomas Hardware Company, Paris, Texas, are requested by James H. Goldey, Actuary of Hardware Board of Trade, Limited, 4 and 6 Warren street, New York, to communicate with him.

A copartnership under the firm name of Harmon & Dixon has been formed between H. W. Harmon, formerly with Sise, Gibson & Co., and Geo. U. Dixon, who for a number of years has been with Sargent & Co., for the purpose of conducting a general agency business at 118 Chambers street, New York. They are representing the following manufacturers formerly represented by Sise, Gibson & Co. and are also consummating arrangements for other agencies: Penn Hardware Company, Underhill Edge Tool Company, Roy & Co., Humphreysville Mfg. Company, Bontgen & Co., G. M. Hotchkiss Company, Moran & Sons, Empire Sheathing Paper. These gentlemen, who are favorably known, have the best wishes of the trade for their success.

Kellogg, Johnson & Bliss, wholesale and retail Hardware merchants, of Chicago, have filed a certificate with the Secretary of State of Illinois changing the name of that corporation to Bliss, Bullard & Gormley. Our readers will recall the purchase we mentioned some time since of Kellogg and Johnson's stock in the corporation by Bullard and Gormley. The change of name now made has occurred in the natural order of events.

William Astle, dealer in general Hardware at Momence, Ill., sends us quite a handsome 44-page pamphlet issued by the Momence *Weekly Reporter*, which contains a description of the location of that city and the advantages it presents for industrial establishments, a calendar for 1890 and the business cards of the leading commercial enterprises of the community, among which latter the card of Mr. Astle is conspicuous.

C. Carr & Sons, who have several Hardware stores in different sections of Chicago, suffered the loss of their South Chicago store by fire on the 18th inst. The loss is stated to have been \$2500, exclusive of the building.

Guarantee of Prices.

QUESTION.—Wholesale agent A ordered in May, 1889, of manufacturer B 100 cases of goods at 50 per cent. discount, order reading "Quantity to be taken by December 31, price guaranteed against yourselves to date of shipment." During the summer the price of these goods declined to 60 off, and remained at this price until about November 1, at which time B's best price was 50 and 5 per cent. discount, that being the price prevailing to-day. A now wants the goods shipped, and claims they should be billed at 60 per cent. B claims that they should be billed at 50 and 5. Which of the two parties to the transaction is right?

A good deal of diversity of opinion has been brought out in reply to the above inquiry, and well-informed parties have taken different views of the question.

The matter is presented in a somewhat new light in the following letter, which refers to a conversation with a representative manufacturer:

Permit us to relate a conversation we had a few days ago with a leading manufacturer who was soliciting our order for a line of goods whose sale by us is mostly in June. The order was placed upon the following terms: Discount 60 per cent., invoice to date April 15, 60 days, 2 per cent. 10 days, delivered, goods to be sent on that date or as much earlier as the maker desired, price guaranteed against themselves to date of invoice (April 15). Without referring to *The Iron Age* controversy in any way, but simply to the terms of our order, we asked him the following question: The discount being now 60 per cent., suppose it unexpectedly falls during February to 60 and 10 per cent., remaining so about one month, when the price is changed to 50 and 10 per cent., and remains so to the end, what discount would you bill the goods at April 15? He replied, 50 and 10 per cent., that being the price on date of shipment. Re-

ing the advance in Nettings, they are still offering at the old discount. They allude as follows to the condition of the market:

There has been a feeling on the part of the trade since the apparent collapse of the Federal Steel Company that it would have a tendency to create a sag in the market, but these beliefs have originated in the minds of our country friends, based upon no positive information as to the real condition of affairs, and it is demonstrated that the withdrawal of the Federal Steel Company has not, will not and cannot in any way affect the future market. The advance is and has been found in the firm condition of raw materials, and so long as they tend upward, so long will manufactured goods be affected.

A correspondent in Kentucky refers to the condition of business as affected by the weather, higher prices of goods and the lower prices of produce:

In October we had a good Stove and Hardware trade, and were well pleased, having, as we put it, very fine prospects for November. The time came, but trade was 40 per cent. below the mark. Then December was like unto a May month. What should have been our best Stove month was an utter failure in that line, and this month, so far, is no better. In other branches trade has been moderate, but as the weather was out of season so were the expected



ELWOOD BURDSALL.

ferring him to the discount, 60 per cent., in our order, he admitted that he would have to bill ours at 60 per cent. Suppose now, we ask, you are unable to get all your orders on this trip, our main competitor in this city, for instance, and that later on while the discount is 60 and 10 per cent. you take his order, what would you invoice our goods at? His reply was 60 and 10 per cent. It would seem as if manufacturers do not feel bound to give all their customers the benefit under the guarantee, but rather only those who are wide-awake and claim it at the time and all others in his vicinity who would be affected by his competition. That of localities widely separated one may need it and be given it, while the other locality, being free from the disturbing elements, does not receive it.

Trade.

The Freeman Wire and Iron Company, St. Louis, Mo., issue a circular of prices in which Barb Wire is specially referred to. They also illustrate Wire Stands, Grave Guards, Railings for desks and counters, Crestings and Finials, and call special attention to their Poultry Nettings, &c., which, they mention, notwithstand-

customers. Our worst fears now are that the warm weather having forced all vegetation beyond its normal state, should cold weather set in it would certainly ruin all the early small fruit crop. Then, too, higher prices on Hardware, Nails, Wire, Tinware, &c., with lower prices for tobacco, corn, wheat, hay, &c., don't go well together and naturally make the farmers' purchases lighter. Still, we hope for a fair spring trade, as we think that the consumers must have some goods and consider that it will be divided as usual.

Elwood Burdsall.

In the death of Elwood Burdsall, the senior member of the firm of Russell, Burdsall & Ward, the well-known Bolt manufacturers, Port Chester, N. Y., the trade loses one of its oldest, best known and most honored representatives. His connection with the establishment of American manufactures, the development of an important industry, his wide acquaintance in the trade and his personal worth, gave him a position of exceptional prominence. His death at the age of 75 years occurred on Monday, December 30. Its cause was pneumonia, and as this was the third attack to which he had been subjected his recovery from the first was a matter of grave doubt. The funeral was

held Friday, January 3, in the Friends' Meeting House at Purchase, N. Y., and was very largely attended by persons of all classes from Port Chester and the surrounding country, and among them were many representatives from the works, including many who had been associated with Mr. Burdsall for many years, by whom their former employer was evidently held in very affectionate regard.

Mr. Burdsall was born at New Brunswick, N. J., July 18, 1814. His ancestors were among the early English settlers of this country. Those on his father's side were members of the Society of Friends, while those of the mother were Presbyterians. His maternal grandfather served in the army during the Revolutionary War and was engaged in the battles of Trenton and Monmouth. After receiving a common-school education such as the neighborhood in which he lived afforded, Mr. Burdsall, whose father had died in 1823, when he was but nine years of age, left his native place in 1829 and learned the carpenter's trade at Philadelphia. In 1835 he journeyed to Appalachieola, Fla., where he erected a number of dwellings and warehouses. In 1837 he was elected a member of the City Council of Appalachieola. Shortly after the yellow fever broke out and prevailed for some time with unusual fatality. Many of the inhabitants became panic-stricken and fled from the city, among the fugitives being all the members of the government except the City Treasurer, a Mr. Boot, and Mr. Burdsall. The latter organized a hospital outside the town and with the aid of other courageous men gathered the sick together and placed them in the wards, where he attended them more or less frequently every day. For nearly two months the fever continued to rage, little business being transacted during the time and the dead being buried without funerals. Mr. Burdsall remained in Florida till 1844, when he left that State for New York. He then associated himself with William E. Ward, and they founded the Bolt manufacturing business at Port Chester. The original name of the firm was Burdsall & Ward, which was changed to Russell, Burdsall & Ward upon the addition to it of Isaac D. Russell. The firm has retained the latter name ever since and has been successfully managed under it for the past 45 years. Whether through Mr. Burdsall's management or that of those associated with him in the conduct of the extensive Bolt factory, it is said there has never been a strike in the shops nor the manifestation of discontent among the employees. A library and hall were built by the firm for their benefit and a guild formed in the shop by which a benefit was paid to the families of deceased employees.

In 1851 Mr. Burdsall married Miss Hannah G. Haviland, a daughter of John Haviland, a member of one of the oldest families in Harrison. Two sons, Elwood and Richard H., who were associated with him in business, survive him.

At the organization of the First National Bank of Port Chester Mr. Burdsall was elected president, and was re-elected annually. The bank was from its inception a success, and his shrewd and conservative views contributed much to this result. Its new bank building, now in course of construction, was a part of the great work of Mr. Burdsall for Port Chester.

Mr. Burdsall was elected in 1863 a manager of Swathmore College, an institution under the care of the Society of Friends, near Philadelphia, which position he resigned ten years later. Since 1867 he has been a manager of Chappaqua Mountain Institute, near Chappaqua, Westchester County, which is also under the care of the Society of Friends. He was also interested in a number of other enterprises, some of which are in the neighborhood of his home and others

By R. W. Forbes & Son.—750 pounds Nails, 130 dozen Axe-Handles, 6 dozen Axes, 2 dozen Wash-Boards, 4 dozen Shovels, 120 feet Rubber Hose, 23 dozen Hatchets, 30 dozen Axes, 4½ dozen Wrenches, 1½ dozen Cow-Bells, 1 package Scrapers, 3 crates Shellers, 594 pounds Carriage-Bolts, 9700 Carriage-Bolts, 20 dozen Shovels, 4 packages Harrows.

By A. Field & Co.—40 dozen Whips, 76 pounds Hardware, 1 gross Axle-Grease, 7 dozen Hardware, 36 dozen Whips.

By A. S. Lascelles & Co.—1 box Iron Castings, 1 Oil Stove, 2 cases Farming Mills and Elevators.

By Welsh & Lea.—3 cases Springs.

PER SHIP MOUNT CARMEL, DECEMBER 30, 1889, FOR SYDNEY, N. S. W.

By Coombs, Crosby & Eddy.—10 dozen Axes, 391 dozen Hardware, 4½ dozen Wrenches, 5 dozen ladders, 35 dozen Saws, 6 dozen Door Springs, 224 pounds Washita Stone, 10 dozen Hammers, 96 dozen Handles, 20 dozen Axes, 87 dozen Hardware, 2 dozen Carpenters' Tools, 9 dozen Hardware, 2 dozen Saws, 10 dozen Axes.

By R. W. Cameron & Co.—25,000 pounds Axes, 2 barrels Chain, 296 Police Batons, 1 case Hardware, 50 dozen Handled Axes, 150 dozen Handles, 53 packages Carriage-ware, 1 case Hardware, 6 Stoves, 4 cases Hardware, 48 Axes, 12 Sad Irons, 1 box Lampware, 1 case Castings, 250 Axle Clips, 3498 pounds Iron Bolts, 6 Carriage Springs, 1 case Nails, 3 packages Forgings, 24 Corn Mills, 4 Forges, 2 cases Emery Cloth, 3 cases Hardware, 2 cases Tools, 2 Iron Barrows, 1 case Machinery, 1 case Hardware, 72 Locomotives, 9 packages Ore Crushers and Fixtures, 3 boxes Machinery, 4 Stationary Engines and 4 Iron Pulleys, 23 crates Pulleys, 1 box Saw Blades, 1 box Sawmill Machinery, 4 cases Lamp-Ware, 700 dozen Handles.

By Barden & Ackerman.—6 cases Britannia Ware.

By Russell & Erwin Mfg. Company.—7 cases Hardware.

By A. Field & Sons.—4145 pounds Iron Tacks.

By C. B. Rogers & Co.—12,375 pounds Machinery and Belting.

By Welsh & Lea.—6 cases Iron Bolts.

By C. Walker.—4 boxes Iron Vises.

By J. W. Horton & Son.—1 dozen Wire Mats.

By Rand Drill Company.—1 box Iron Castings.

By Edward Miller & Co.—48 packages Lamp Goods.

By Meriden Britannia Company.—3 boxes Plated Ware.

By Winchester Repeating Arms Company.—30 Guns, 28,000 Cartridges.

By E. W. Harrison.—2 boxes Steel Chucks, 2 cases Leather Belting.

By Healy & Earl.—12 cases Pumps and 4 bundles Brakes for same, 5 cases Wood-Working Machinery, ½ dozen Saws, ½ dozen Windmills.

By Woodhouse & Stortz.—4218 pounds Hardware, 63 pounds Lamp Goods, 57 pounds Stove Polish, 50 pounds Shoe Brushes.

By W. K. Freeman.—1 dozen Drills, 4 cases Hardware, 800 pounds Hardware, 24 dozen Picks, 8 packages Hardware, 1007 pounds Tackle Blocks.

By F. B. Wheeler & Co.—20,048 pounds Barb Wire, 60 dozen Handles, 24 dozen Cutlery, 1 case Hardware.

By Morris, Strouse & Co.—60 dozen Axe Handles, 35 dozen Axes, 30 dozen Hoes, 84 dozen Axe Handles.

By Arkell & Douglas.—43 cases Edge Tools, 8 packages Plated Ware, 30 dozen Handles, 2 dozen Wringers, 5 packages Lampware, 3 dozen Bench Screws, 2 dozen Oil Stones, 24 dozen Wrenches, 3 cases Hardware, ¾ dozen Wringers, 4 cases Saws, 1½ dozen Sad Irons, 15 dozen Wrenches, 4 cases Lamp Goods, 9 dozen Molasses Gates, 1 gross Traps, 5 cases Hardware.

By A. S. Lascelles & Co.—12 dozen Picks, 24 dozen Hatchets, 10 dozen Axes, 18 dozen Forks, 1 gross Horse Brushes, 1 gross Squeezers, 168 pounds Nails, 3 dozen Levels, 1½ gross Hammers, 4 boxes Hardware, 3 dozen sets Sad Irons, 3 dozen Razor Strops, 1 dozen Tills, 1 case Firearms, 1 case Rifles, 6 gross Cow Bells.

By Arnold, Cheney & Co.—7500 pounds Carriage-ware, 5 cases Machinery, 11 packages Machinery, 3 cases Rakes, &c., 3 cases Wringers, 843 pounds Axes, 2000 pounds Castings and Hardware, 6 crates Wheels.

By R. W. Forbes & Son.—19 dozen Axes, 5 dozen Forks, 10 dozen Rake Handles, 445 pounds Tire Bolts, 5 packages Plows, 3 packages Cultivators, 200 dozen Axe Handles, 500 feet Hose, 14 packages Stoves, 1 dozen Perambulators, 32 packages Stoves, 15 Choppers, 2 dozen Sad Irons, 25 packages Hardware, 4 packages Hardware, 5 packages Hardware, 4 packages Wood-Working Machinery, 1 barrel Grinding Machines, 7 packages Corn Mills, 8 packages Harrows, 25 packages Hardware, 4 packages Hardware, 1 case Pump Fixtures.

REVIEW OF THE WHOLESALE MARKET IN PAINTS AND OILS.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Paints and Colors.

In all quarters satisfaction is expressed as regards business in the more staple goods, and with here and there an exception the market appears to be in quite good shape. Manufacturers of White Lead and by-products remark that the amount of sales for prompt and forward delivery has met the most sanguine expectations. Nearly as favorable experience seems to have been enjoyed with Zincs and with the general line of house-painters Colors and ready-mixed Paints. Jobbers, too, report a satisfactory trade, stating in some instances that their sales to date exceed those of January last year. There have been few and only unimportant fluctuations in prices, the general market showing steadiness as well as a fair degree of activity.

White Lead.—Corrodors generally report very satisfactory sales to both local and out-of-town customers. The rebates adopted on the 2d inst. prove satisfactory and have prompted jobbers to order more freely than they did at the beginning of last year in the face of somewhat increased outside competition. Strictly pure White Lead in Oil does not appear to be offered by outside makers at less than the trust net prices, but a very good article containing a small percentage of Zinc sells at 6¢, less 2½¢ for cash in 15 days, in jobbing quantities, and inferior kinds at down to as low as 5¢. The poor article, however, has limited sale and does not appear to come into competition with reputable brands. The Standard (anti-trust) White Lead Company's works are now in full operation and turning out a very fine article. Their capacity is about 5000 tons per annum.

Red Lead and Litharge.—Have been selling to a fairly satisfactory extent, the demand showing decided improvement over what has been experienced previously this month. Prices are without change.

Zincs.—American Oxide remains very steady at the former line of prices. Manufacturers are still moving off considerable stock in delivery on contracts, and the daily orders for moderate sized lots for prompt delivery are fully up to the average amount. Foreign Zincs have had fair sale in a jobbing way and remain steady at previous prices.

Colors.—Contracts to a considerable amount have been made for grinders' Colors since the holidays and the market is in good shape at the present time, with prices steady. House-painters' Colors have been distributed to a satisfactory extent and nearly all descriptions are steady at former prices. Vermilion is firm at previous rates, as is also Carmine. Paris Green has undergone no change since the date of the announcement of the association prices, but some outside manufacturers, it is said, are practically out of the market at present.

Ready-mixed Paints have had freer sale the past week than previously this month. Manufacturers' prices remain as before, being affected but slightly by the recent changes in Lead.

Miscellaneous.—There is no change whatever in the position of Chalk and prices are nominal, Whiting and Paris White are still moving to a satisfactory extent at generally steady prices. Barytes remains firm and is in very fair demand.

Animal and Vegetable Oils.

Few changes have taken place in this line. The most striking of those changes is a further rise in the price of Olive Oil, the bulk of the supply of which is controlled by one firm. Business has been of routine character for the most part, yet very fair all told, and the general demand is in line with what is usually experienced at this period of the year. No new features have come to the surface foreshadowing or suggesting any radical movements of prices in the near future.

Linseed Oil.—City crushers report a quite liberal movement the past week, and nearly all the arrivals of out-of-town brands have been disposed of. The condition of the seed market and the general situation are practically the same as 60 days ago. Prices are unchanged and firm.

Cotton-Seed Oil.—A stronger tone to the lard market has operated to induce buyers of crude Cotton-Seed Oil to take hold more freely, and the greater portion of 2000 barrels, if not fully that quantity, has been disposed of at 28¢ for prime quality. The refined product, while not as active as during the preceding week, has met with very fair sale, and prices for all descriptions remain steady.

Lard Oil.—While prices are not notably higher, the market for Lard Oil is firmer and sales of popular brands have been more liberal. There is a very good general demand, which, along with the advance in raw material, improves the tone of the market.

Olive Oil.—Holders now have prices quite firmly established at 83¢ @ 85¢ for yellow Italian oil in barrels, or nearly on a parity with cost in the foreign market. The demand is slow at the advanced price and wholly for small lots.

Palm Oil.—There have been a number of sales of prime quality Oil at 5½¢ in Boston and some movement of inferior grades at 4¢ @ 4½¢. Supplies are in very good position and held firmly.

Sperm and Whale Oils.—Neither home nor export buyers have manifested fresh interest in the crude products and no change is visible in the position of holders. The manufactured Oils have had steady sale and are without change in price.

Menhaden Oil.—Neither exporters nor home buyers have taken any considerable amount of the crude Oil and business in the manufactured products has been of the routine sort, but very fair all told.

Cocunut Oil.—Ceylon from store is selling in a moderate way at 5½¢ @ 5¾¢, as to style of package. The demand at present is slow. Other varieties remain dull.

At Pittsburgh last week a statement was filed in the suit of Ralph Bagaley against the Pittsburgh and Lake Superior Iron Company. Mr. Bagaley claims that he is a stockholder in the company, owning 9480 shares in full paid-up capital stock. On December 5, 1889, by a resolution of the Board of Directors, a dividend of 50 cents on each share was declared upon the capital stock. This dividend has been paid to all the stockholders but himself, and he has demanded the amount, \$4740, but it has been refused him. He now sues to recover it.

It is reported that the furnace of the Pottstown Iron Company and the Swede Furnace at Swedeland have chilled.

The Pennsylvania Lead Company, of Pittsburgh, have increased their capital stock from \$500,000 to \$1,000,000. A charter for the new corporation was granted last week. It is the intention of the company to largely increase the capacity of their plant.

Improved Rapping Plates.

Donald Fraser, Milwaukee, Wis., is manufacturing the rapping plates represented in the accompanying engravings. Fig. 3 shows a plate full size, Figs. 1 and 2 being reduced in size. Considerable labor and expense have been encountered in shops where pattern-making is done in constructing rapping plates, but those put

hinged together. Attention is called to the simple manner in which the trap is set, the operation being shown in an illustration given in Mr. Hotchkiss' circular. The ease with which this is accomplished makes the trap, it is claimed, practically self-setting. The efficiency of this trap, and its lightness and compactness are also referred to by the manufacturer. It is packed half a dozen in a box, 6 by 4 by

screwed upon the wall, while it gives the hook a finished and presentable appearance whether it has actually been put up straight or not. The small hole in the plate is intended for an escutcheon pin if more strength and security are desired, but the pin is not used in ordinary cases. The manufacturers state that this hook, when made in larger sizes of heavy wire, makes a handsome and massive hook for hotels, factories and other public places. It is made enameled and brass plated in a variety of sizes.



Fig. 1.



Fig. 2.



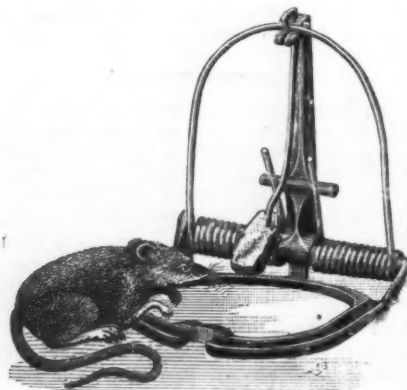
Fig. 3.

Improved Rapping Plates.

on the market by Mr. Fraser are produced with little labor and at a comparatively low cost, which tends to their plentiful use and the consequent saving of patterns. The plates shown, as well as all the others made, are of such shape that all the cutting necessary for fitting them can be done with boring bits. The plates are described as made of a fine quality of malleable iron and in such a large variety of styles and sizes as to adapt them to all kinds of wood patterns. A large poster is issued which gives full-sized illustrations of some of the goods. The manufacturer refers to the gratifying reception which they have received wherever introduced.

New Rat Killer.

Edward S. Hotchkiss, Bridgeport, Conn., is putting on the market the rat trap shown in the illustration herewith given, which represents its construction and the manner in which it operates. This



New Rat Killer.

article is put on the market to meet the demand for a somewhat cheaper trap than the Hotchkiss Improved Rat Killer, and embodies all the essential features of the latter. The trap is described as made from the best malleable iron, well japanned, with coppered steel spring wire. It consists of two sections which are

4½ inches, and one gross in a case. In connection with his other manufactures Mr. Hotchkiss desires us to state that he has exceptional facilities for all classes of press and special work.

The Czar Steel Wire Coat and Hat Hooks.

In the accompanying illustration is represented full size a new coat and hat hook which is being introduced by the



The Czar Steel-Wire Coat and Hat Hooks.

Wire Goods Company, Worcester, Mass. The illustration indicates clearly the novel feature which the hook possesses as well as its general appearance. The manufacturers state that having become thoroughly satisfied that a wire hook will meet with favor because of its durability, as it has no tendency to break off, they were convinced that something of attractive form and design would meet with favor in the trade. The result of their effort is the hook represented herewith, which, it will be observed, has a base which serves as an ornament as well as securing much additional strength for the hook. The hook is described as so shaped that any weight hung upon the end of it will bear down upon the lower brace until it strikes against the wall, when the weight will all come upon the wall and not upon the screw. The plate or steel base on the hook is adjustable, so that it will conform to any angle at which the hook may be

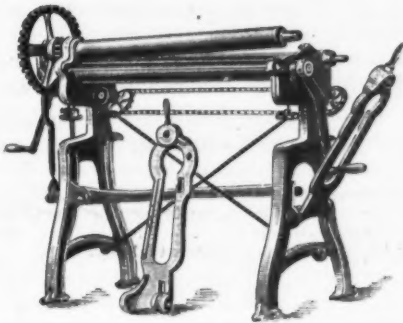
named in the entry were made from blanks of size and weights shown in exhibit in said schedule, which is marked Exhibit A, and is forwarded under another cover.

The Massachusetts prison commissioners recommend the establishment of industrial schools in the State reformatory at Concord, where the men shall be taught in a thorough manner some trade at which they can work when their term of confinement expires, and which should give them a good living. It will be a part of the plan of the commissioners to find places for such as may desire it, and to keep up a friendly intercourse and oversight of them until they are well established. The most successful of the schools of this kind now in operation is in the State institution at Elmira, N. Y., and it is proposed to follow in Massachusetts the methods adopted there. These meth-

ods are the same as those employed in the New York trade schools, which have been in successful operation for half a dozen years or more.

Self-Opening Slip-Roll Former.

In the accompanying illustrations we present several views of the patent quick-adjustable forming-rolls which are being introduced to the trade by Bertsch & Co.,



Self-Opening Slip-Roll Former.—Fig. 1.—Forming-Roll Shown Open to Remove Metal.

Cambridge City, Ind. These rolls are made of any required size from 1 inch up to 10 inches, and are self-opening by the outward swing of the upright buckle bearing hinge. The construction of this latter feature is clearly indicated in Fig.

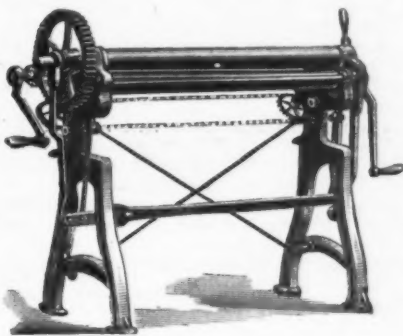


Fig. 2.—Roll Closed for Operation.

1 of the illustrations, where it is shown resting against the front of the frame and also attached at the right of the machine. The construction is such that the two feed or pinching rolls will also open or separate at the opposite end of the lower roll. The

top rolls and at the same time aid to sufficiently raise or open and support them, as shown in the cut. Fig. 1 shows the roll open to remove the metal, while Fig. 2 shows the roll closed for operation and indicates the adjusting support at the left of the lower roll. It is stated that all parts of this machine are so balanced that it is a comparatively easy matter to open or close the roll, it being accomplished in one operation by the simple movement of the top roll journal bearing hinge. When the roll is closed a half turn of the thumb-screw, shown in Fig. 3, will lock it, when it is again ready for operation. The crank may be attached at either end directly on the roll-journal for fast motion when light metal is employed and on either or both ends when heavy metal is used. In case the compound back-gear is not required at all times it can be conveniently dispensed with by sliding the small back-gear pinion on the crank-shaft to one side out of gear and attaching the crank on the roll-journal. The manufacturers state that the rolls are provided with their improved quick adjustment on the back roll, clearly shown in Fig. 3. This attachment consists of a link belt chain and sprocket-wheels on adjusting-screws. One or both ends of the back roll may be quickly and readily adjusted at one time, insuring uniform work and economizing in the matter of time. For cone or tapering work one end of the roll is lifted up to any angle desired and a tapering wedge inserted under the journal-box.

When the lumber supply in Michigan and the South becomes exhausted the far Northwest will remain an unfailing resource. It is said that Puget Sound has 1800 miles of shore line, and all along the line, miles and miles farther than the eye can reach, is one vast and almost unbroken forest of enormous trees. The supply is so vast that although the saw-mills have been working up 500,000,000 feet of lumber taken out of the forest every year for the past ten years, the spaces made by these inroads seem no more than garden patches. An official estimate places the amount of standing timber in that area at 500,000,000,000 feet or 1000 years' supply, even at the enormous rate the timber is now being felled and sawed.

From the annual statement of the movements of sugar, compiled by Willett & Gray, there is shown the total receipts through the four ports of 1,008,810 tons, against 1,084,189 tons in 1888, and distribution 1,029,895 tons, against 1,099,733

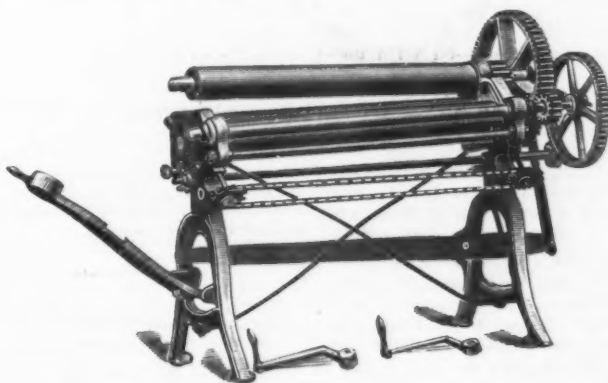


Fig. 3.—Rear View, Showing Chain and Double Back Gear.

latter is provided with an adjusting support, the arrangement being such that the roll will slightly descend at one end, and will not pinch and hold the formed metal when it is opened for the purpose of removing the metal. The manufacturers state that the weight of the lower roll descending is such as to counterbalance the

tons in 1888. The entire consumption of the United States was 1,457,561 tons, of which Louisiana supplied 145,000 tons, or one-tenth. The raising of beet and sorghum sugar made but little progress in 1889 as regards increased quantity produced, but experiments were continued on a larger scale than heretofore, with fair

success under discouraging circumstances. The latest estimate of the Louisiana crop of 1889-90 is 141,000 tons, against 144,878 tons in 1888.

Rack for Wire Cloth.

We are indebted to Drury & Hay, 1208 Third avenue, South, Minneapolis, Minn., for a sketch of a rack for wire cloth which they find of great utility and advantage in their stove and hardware store. A very good idea of the construction and arrangement of this rack can be gathered from an inspection of the accompanying illustration. It is made of 1-inch gas pipe, outside measurement, one end being fastened to the counter while the other end may be fastened to the shelving or wall, as indicated in the cut. The upright support is



Rack for Wire Cloth.

6 feet 10 inches in height and is provided with 9 arms, upon which may be slipped rolls of wire cloth ranging in width from 20 to 36 inches. The arms are placed 7 inches apart and in such position as to allow of the cloth being conveniently unrolled and measured upon the counter without the necessity of removing from the rack. This device has given very satisfactory results in operation and the firm submit it as of possible interest to the trade generally.

Oregon boasts of the exports of her coal fields. East and west of the Cascades, but more particularly west, is a magnificent range of bituminous coal. The real coal region lies between the Cascade Mountains and Puget Sound, and there are now over 12 mining camps in full operation. Only one class of coal so far has been developed to any extent, the bituminous or soft coal, but this now forms one of the most important articles of export from the Puget Sound region, and there are never less than half a dozen, and often many more vessels loading coal in Tacoma and Seattle. An average of 3000 tons a day is exported from these localities, of which Seattle furnishes about two-thirds. There are two main fields now being worked, the King County and Wilkeson. In the former are the mines of the Oregon Improvement Company, at Newcastle Franklin and Black Diamond, which furnish the larger part of the supply sent daily to San Francisco.

Forsyth, Hyde & Co., pig iron merchants, Chicago, are distributing souvenirs in the form of a paper weight, bearing a lion's head in bas-relief. The article is handsomely electro-bronzed and makes an attractive ornament for the desk as well as an effective advertisement for the firm.

Providence Notes.

TO LICENSE ENGINEERS.

A member of the General Assembly who is an employer of several hundred workmen is at work on a bill which he will introduce next week to establish an examining board of engineers. He said to *The Iron Age* correspondent:

A suggestion in this line was made some time ago, and I have been thinking of it ever since. It seems to me that there should be some law governing the employment of men who have charge of steam boilers—that is, I would have some evidence or guarantee that they are competent. At present there is practically no regulation whatever. It is true in some cities there are inspectors of boilers, but their duties are only to see that the boiler is in a fit condition to be used. The best boiler ever made in the hands of an incompetent man could be exploded in a very few hours, and the consequence would be probably a very large loss of life and the destruction of thousands of dollars' worth of property. I have never been able to find out why it is that about two men out of every three you meet with who are out of work think they can take charge of a boiler or run an engine. Why, in my own business I have seen this fact illustrated time and time again. I have had carpenters, masons, painters and coal heavers apply for the position of engineer. When I asked them if they had had any experience they said they had not, but they thought they could run the boilers after they got the hang of the work.

My plan is to pass a law which will establish an examining board which shall be made up of competent engineers. Then I would provide that no person shall be employed as an engineer unless he has passed an examination before this board and has been given a certificate. This is a mere sketch of the bill I am at work upon. The details I will have to fill in later, but you can see that it is a move in the right direction, because it will guarantee reasonable safety from explosions to both employers and employed.

ENGINES FOR THE CRUISERS.

About two years ago a contract was made by the Government with the Armington & Sims Engine Company, and since that time they have furnished an engine for almost every cruiser under Government command. The two last engines to be made are to be placed in the steamers *Petrel* and *Vesuvius*, and they were officially tested recently by Lieut. T. E. De Witt Veeder. The engines are of about 20 horse-power each, and it took the company about one month to build each engine. These special marine engines are a wholly new departure for the company, but after after an experiment of two years the Government has most fully indorsed them.

THE NEW TORPEDOES.

In a few days the Hotchkiss Ordnance Company will commence to fulfill their contract with the Government for furnishing launching tubes and torpedoes for the new steel cruisers.

There are a number of different torpedoes now being used by the various nations of the world. All of these have their good points, but Lieut. J. L. Drake, of the Naval Ordnance Corps, who is at present in this city attending to the fulfillment of the torpedo contract, states most emphatically that the torpedo which is now being made under his supervision is to be the torpedo of the future.

For over eight months they have been experimenting with and perfecting this instrument of warfare, and at last they have been so successful that they are ready to commence their manufacture. The last private test will be made at the laboratory

of the Armington & Sims Steam Engine Company. If this test is successful the launching tubes and the torpedoes will be turned out as rapidly as possible. The torpedoes which are to be made here are after the design by Capt. J. A. Howell, of the United States Navy, and the tests of the past eight months have proved to Lieutenant Drake's satisfaction that they will surpass in many ways any of the torpedoes used by the other nations.

The principal points of difference between this torpedo and any other are these: All other torpedoes, when fired from the launching tube, have directive force due to velocity, but this torpedo is steered by internal mechanism, due to power supplied by a steel wheel of great velocity in the vertical longitudinal plane of the torpedo.

Another point of difference, and a most important one, is that when the torpedo is fired from the tube it can be fired at any angle from the vessel without altering the direction of the aim when it strikes the water. The great trouble with the other torpedoes is that when they strike the water at a great angle they are liable to be thrown up into the air, down into the water, or even back toward the vessel from which they were fired. The launching tubes are pneumatic, and it makes no difference if the vessel is going as rapidly as a railroad train, and if the torpedo is fired at a great angle it is not deflected by the contact with the water. This is a characteristic which no other torpedo possesses. The test which is to be made will be upon the steam turbine which is to give the velocity to the wheel which steers the torpedo, it having, of course, no steering rudder.

CLIFFORD.

The first annual meeting of the Edison General Electric Light Company, which was formed to consolidate under one management the various Edison companies, was held 21st inst. The report of the company showed the great expansion of the business of electric lighting during 1889, and indicated that there would be even greater growth in 1890. One item in the report says: "The new business in sight in every department is in such a state that if the company succeed in increasing their capacity sufficiently to execute it the gross receipts in 1890 will be twice as large as in 1887-1888." The number of employees in the Schenectady shops in 1888 was 750, last year 1800, and this year it is proposed to increase the working force to 2000. A large number of men are also employed in other places and in the other departments of the company's work. During the past year 2500 dynamos and motors were manufactured. The number of street-railway cars equipped with motors was 551.

Dispatches to the daily press from Washington announce a distressing accident which occurred in that city on the afternoon of the 6th inst. While August Nagle, employed as a helper at Whyte & Brothers Cornice Works, was engaged in raising a cornice upon the roof of the five-story block of Gibson Brothers, located at the corner of Pennsylvania avenue and Thirteenth street, he lost his balance and fell from the roof upon the iron railing that surrounds the basement, 50 feet below. Three of the dagger-shaped railings pierced his body, killing him instantly.

The keel of the steamship *El Sol* was laid at Cramp's Shipyards last week. This vessel was recently contracted for by the Morgan Line Steamship Company for service between New York and New Orleans. She is to be 400 feet long, and when completed will

be the largest steamship of her class ever built in the United States. The craft is for freight only.

A meeting of the Nut and Bolt Manufacturers' Association was held at the Hotel Anderson, Pittsburgh, last week. The meeting was fairly well attended, about 15 firms being represented. It was decided to make no change in the present list.

The contract for furnishing the machinery for the King Locomotive Works, which is soon to be established at Bordentown, N. J., has been given to Miles, Bement & Co., of Philadelphia.

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CURRENT HARDWARE PRICES.

JANUARY 22, 1890.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, No. 1000—

Hicks & Goldmark's and Union Metallic Cartridge Co.	34@35¢
F. L. Waterproof, 1-10's.	40@45¢
E. B. Trimmed Edge, 1-10's.	40@45¢
E. B. Grand Edge, Cent. Fire, 1-10's.	40@45¢
Musket Waterproof, 1-10's.	50¢
G. D.	50¢
S. B. Genuine Imported.	50¢
Eley's E. B.	54¢ @ 55¢
Eley's D Waterproof, Central Fire.	\$1.00

Cartridges.

Rim Fire Cartridges.	50¢@52¢
Rim Fire Military.	52¢@55¢
Cent. Fire, Pictol and Rifle.	52¢@55¢
Cent. Fire, Military and Sporting.	52¢@55¢
Blank Cartridges, except 22 and 32 cal., additional 10¢ on above discounts.	
Blank Cartridges, 22 cal., \$1.75.	2¢
Blank Cartridges, 32 cal., \$3.50.	2¢
Primed Shells and Bullets.	15¢@22¢
B. B. Caps, Round Ball, \$1.75.	2¢
B. B. Caps, Con. Ball, Swg'd., \$2.00.	2¢

Primers—

Berdan Primers, \$1.00.	2¢
B. L. Caps (for Sturtevant Shells) \$1.00.	2¢
All other Primers, \$1.20.	2¢

Shells—

First quality, 4, 8, 10 and 12 gauge.	25¢@28¢
First quality, 14, 16 and 20 gauge (\$10 list).	30¢@32¢
Star, Club, Rival and Climax brands.	20¢@22¢
Selbold's Comb. Shot Shells.	15¢@23¢
Brass Shot Shells, 1st quality.	60¢@62¢
Brass Shot Shells, Club, Rival, Climax.	62¢@64¢
I. X. L. 10 and 12 gauge.	40¢@42¢
"Special," 10 gauge.	40¢@42¢
"Special," 10 and 12 gauge.	40¢@42¢
Fowler's Pat.	\$3.25

Shells Loaded—

Standard. List.	40¢@42¢
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Wads—Price per M.

U. M. C. & W. R. A.—B. E., 11 up.	82¢
U. M. C. & W. R. A.—B. E., 9&10.	82¢
U. M. C. & W. R. A.—B. E., 8.	90¢
U. M. C. & W. R. A.—B. E., 7.	\$1.10
U. M. C. & W. R. A.—P. E., 11 up.	1.15
U. M. C. & W. R. A.—P. E., 9&10.	1.15
U. M. C. & W. R. A.—P. E., 8.	1.70
U. M. C. & W. R. A.—P. E., 7.	1.80
Eley's B. E. 11 up.	\$1.75
Eley's P. E. 11 up.	2.80

Anvils—

Eagle Anvil, \$10.	15¢@15.5¢
Peter Wright's.	10¢
Armstrong's Mouse Hole.	9¢
Armstrong's Mouse Hole, Extra.	11¢@11.5¢
Trenton.	9¢@10¢
Wilkinson's.	9¢@10¢
J. & Riley Carr. Pat. Solid.	11¢@11.5¢
Moore & Barnes Mfg. Co.	33¢@35¢

Anvil Vise and Drill—

Millers Fall & Co., \$10.	30¢
Cheney Anvil Vise.	25¢
Allen Anvil and Vise, \$3.00.	40¢@45¢
Star.	45¢@50¢

Apple Parers—

Advance.	\$ doz \$4.75
Antrim Combination.	\$ doz 5.50
Baldwin.	\$ doz 5.25
Champion.	\$ doz 7.25
Daisy.	\$ doz 4.00
Eureka, 1888.	each 12.00
Family Bay State.	\$ doz 12.00
Favorite.	\$ doz 5.50
Gem.	\$ doz 5.25
Gold Medal.	\$ doz 4.00
Ideal.	\$ doz 4.00
Improved Bay State.	\$ doz 30.00
Little Star.	\$ doz 4.50
Monarch.	\$ doz 13.50
New Lightning.	\$ doz 5.00
Orion.	\$ doz 4.00
Penn.	\$ doz 4.00
Perfection.	\$ doz 4.00
Pomona.	\$ doz 4.00
Rocking Table.	\$ doz 6.00
Turntable.	\$ doz 4.50
Victor.	\$ doz 13.50
Waverly.	\$ doz 4.00
White Mountain.	\$ doz 4.50
72.	\$ doz 4.25
70.	\$ doz 5.75
78.	\$ doz 6.50

Augers and Bits—

Douglas Mfg. Co.	
Wm. A. Ives & Co.	
Humphreysville Mfg. Co.	70¢
French, Swift & Co. (P. H. Beecher, [P. S. & W. Co.]	
Rockford Bit Company.	
Cook's, Douglas Mfg. Co.	55¢
Cook's, N. H. Copper Co.	50¢@10¢@50¢
Ives' Circular Lip.	60¢
Patent Solid Head.	30¢
C. E. Jennings & Co.	40¢
Up.	40¢
C. E. Jennings & Co., No. 30.	60¢
C. E. Jennings & Co., Auger Bits, set, 32¢ quaters, No. 5, 45¢; No. 30, \$3.50.	
Lewis' Patent Single Twist.	45¢
Russell Jennings' Augers and Bits.	25¢@10¢
Imitation Jennings' Bits.	60¢@80¢
Snell's Jennings Pattern.	60¢
Pugh's Black.	30¢
Rockford, Jennings' Pattern.	30¢
Car Bits.	50¢@10¢@60¢
Car Bits, P. S. & W. Co.	60¢@10¢
Snell's Car Bits.	15¢@10¢
L. Hommedieu Car Bits.	15¢@10¢
Worthington Pat. Auger Bits.	10¢
Cincinnati Bell-Hangers' Bits.	30¢

Hollow Augers—

Ives' French, Swift & Co.	33¢@40¢
Bouglas' Adjustable, \$ doz \$48.	40¢@10¢
Stearns' Universal Expansive, each \$4.50.	50¢@55¢
Wood's Cincinnati Adjustable.	25¢@25¢@10¢
Cincinnati Standard.	25¢@10¢

Expansive Bits—

Clarke's small, \$18; large, \$26.	35¢@35¢@55¢
Ives' No. 4, \$ doz \$60.	40¢
Swan's.	40¢
Stearns' No. 1, \$26; No. 2, \$22.	35¢
Stearns' No. 2, \$48.	20¢

Gimlet Bits—

Common.	\$ gross \$2.75@3.25
Diamond.	\$ doz \$1.10.
Ree.	25¢@25¢@55¢
Double Cut, Sheppardson's.	45¢@45¢@10¢
Double Cut, Ct. Valley Mfg. Co.	30¢@10¢
Double Cut, Hartwell's, \$ gro.	55¢
Double Cut, Douglass.	40¢@10¢
Double Cut, Ives.	60¢@60¢@10¢

Bit Stock Drills—

Morse Twist Drills.	50¢@10¢@55¢
Standard.	50¢@10¢@55¢
Cleveland.	50¢@10¢@55¢
Syracuse, for metal.	50¢@10¢
Syracuse, for wood (wood list).	30¢@30¢@55¢
Williams' or Holt's, for metal.	50¢@10¢@55¢
Williams' or Holt's, for wood.	40¢@10¢
Cincinnati, for wood.	30¢@55¢
Cincinnati, for metal.	40¢@10¢

Ship Augers and Bits—

L. Hommedieu's.	15¢@10¢@15¢@10¢@55¢
Watrous.	15¢@10¢@15¢@10¢@55¢
Snell's.	15¢@10¢@15¢@10¢@55¢
Snell's Ship Auger Pat'n Car Bits.	15¢@10¢@15¢@10¢@55¢

Awl Hints—

Sewing, Brass Fer. \$ gr \$3.50.	45¢@10¢
Pat. Sewing, Short, \$1.00 \$ doz.	40¢@10¢
Pat. Sewing, Long.	\$ doz \$1.20
Pat. Peg, Plain Top, \$ gr \$10.00.	45¢@10¢
Pat. Peg, Leather Top, \$ gr \$12.00.	45¢@10¢

Awls, Brad Sets, &c—

Awls, Sewing, Common \$ gr \$1.70.	35¢
Awls, Should. Peg, \$ gr \$2.45.	40¢@40¢@10¢
Awls, Pat. Fox, \$ gr \$3.	40¢@40¢@10¢
Awls, Shouldered Brad, 2.70 \$ gr.	35¢
Awls, Handled Brad, \$7.50 \$ gr.	45¢
Awls, Handled Scratch \$ gr \$7.50.	35¢@10¢
Awls, Socket Scratch, \$ doz, \$1.50.	25¢@30¢

Awl and Tool Sets—

Alken's Sets, Awls and Tools.	
No. 20, \$ doz \$10.00.	55¢@10¢
Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9.	25¢@25¢@10¢
Miller's Falls Adj. Tool Hds.	25¢
Nos. 1, \$12; 2, \$18.	
Henry's Combination Haft.	\$ doz \$6.50
Brad Sets.	
No. 42, \$10.50; No. 43, \$12.50.	70¢@10¢@55¢
Stanley's Excelsior:	
No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.	30¢@10¢

Axes—

Makers' and Special Brands—	
First quality.	\$ doz \$6.00@6.50
Others.	\$ doz \$5.50@5.75

Axle Grease—

Fraser's.	Keg \$ 4¢, Pall \$ 5¢
Fraser's, in boxes.	\$ gr \$2.50
Dixon's Everlasting, in boxes.	\$ doz 1¢
Dixon's Everlasting.	\$1.20; 2¢ \$2.00
Dixon's Everlasting.	10¢@10¢@55¢
Lower grades, special brands.	\$ gr \$5.50@7.00

Axles—

No. 1, 4¢@5¢; No. 2, 5¢@6¢@4¢	
Nos. 7 to 14.	55¢@55¢
Nos. 15 to 18.	47¢
Nos. 19 to 22.	70¢
National Tubular Self-Oiling: Standard	
Farm (1 to 5) and Special Farm (A1 to A5):	
Less than 10 sets.	35¢@35¢
Over 10 sets.	35¢@35¢

Bag Holders—

Sprengle's Pat.	\$ doz \$18.
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Balances—

Spring Balances.	50¢
Common 24-lb.	\$ doz \$1.50.
Chatillon's Spring Balances.	60¢
Chatillon's Circular Spring Balances.	60¢

Basins, Wash—

Standard Fiberglass, No. 1, 10½-inch, \$2; 12-inch, \$2.25; 13½-inch, \$2.75; 15-inch, \$3.25.	
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Beaters.

Keystone, P.D.&C., Each, No. 1, \$1; No. 2, \$2.	
See also Egg Beaters.	

Bells.

Hand—

Light Brass.	70¢@10¢ @ 75¢
Extra Heavy.	60¢@10¢
White Metal.	60¢@10¢@10¢
Silver Chime.	35¢@10¢
Globe (Cone's Patent).	25¢@10¢@55¢

Door—

Gong, Abbe's.	35¢@10¢
Gong, Yackey's.	45¢@10¢
Gong, Barton's.	40¢@10¢@55¢
Crunk, Taylor's.	25¢@10¢
Crunk Brooks's.	50¢@10¢@25¢
Crunk Cone's.	10¢

Crunk, Connel's.	20¢@10¢
Lever, Sargent's.	50¢@10¢
Lever, Taylor's Bronzed or Plated, net.	25¢@10¢
Lever, Taylor's Japanned.	25¢@10¢
Lever, R. E. M. Co's.	50¢@10¢@25¢
Pull, Brook's.	50¢@10¢@25¢
Pull, Western.	25¢@10¢

Cow—

Common Wrought.	60¢@10¢
Western.	20¢@10¢
Western, Sargent's list.	70¢@10¢
Kentucky, "Star".	70¢@10¢
Kentucky, Sargent's list.	70¢@10¢
Dodge, Genuine Kentucky.	70¢@10¢@10¢
Texas Star.	50¢@10¢@50¢@10¢@55¢
Call.	40¢@40¢@55¢
Farm Bells.	\$ 3¢@3¢@5¢
Steel Alloy Church and School Bells.	40¢

Bellows—

Blacksmith's.	60¢@60¢@55¢
Molders.	40¢@40¢@10¢
Hand Bellows.	40¢@10¢@50¢

Belting, Rubber—

Common Standard.	70¢@10¢
Standard.	70¢@70¢@55¢
Extra.	60¢@50¢@60¢@10¢
N. Y. B. & P. Co., Carbon.	80¢@10¢@55¢
N. Y. B. & P. Co., Diamond.	50¢@10¢

Bench Stops—

Morrill's.	\$ doz \$9, 50¢
Hotchkiss's.	\$ doz \$5, 10¢@10¢@10¢
Weston's, No. 1, \$10; No. 2, \$9.25.	10¢@55¢
McGill's.	\$ doz \$3.
Cincinnati.	25¢@10¢

Bits—

Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.	
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Bit Holders—

Extension.	
Barber's, \$ doz \$15.00.	40¢@40¢@10¢
Ives, \$ doz \$20.00.	60¢@50¢@60¢@10¢
Diagonal.	\$ doz \$24.00, 40¢
Angular.	\$ doz \$24.00, 40¢@55¢

Blind Adjusters—

Domestic.	\$ doz \$3.00, 33¢@45¢
Excelsior.	\$ doz \$10.00.
Washburn's Self-Locking.	20¢@20¢@10¢

Blind Fasteners—

Mackrell's, \$ doz, \$1.00.	20¢@20¢@10¢
Van Sand's Screw Pat., \$15 \$ gr.	60¢@10¢
Van Sand's Old Pat., \$15.00 \$ gr.	55¢@10¢
Washburn's Old Pat., \$ gr.	\$9.00
Merriman's.	new list
Austin & Brady No. 2008, \$ gr.	\$9.00
Security Gravity, \$ gr.	\$9.00

Blind Staples—

Barbed, ¼ in. and larger.	\$ 7¢@8¢
Barbed, ½ in.	\$ 8¢@9¢

Blocks—

Ordinary Tackle, list May 20, 1889.	50¢
Cleveland Block Co., Mal. Iron.	50¢
Moore's Novelty, Mal. Iron.	50¢

Bolts—

Door and Shutter—	
Cast Iron Barrel, Square, &c.	70¢@70¢@10¢
Cast Iron Shutter Bolts.	70¢@70¢@10¢
Cast Iron Chain (Sargent's list).	65¢@10¢
Ives' Patent Door Bolts.	70¢@70¢@10¢
Wrought Barrel.	60¢
Wrought Square.	70¢@70¢@10¢
Wt'r Shutter, all Iron, Stanley's.	60¢@10¢
Wt'r Shutter, Brass Knob.	40¢@10¢
Wt'r Shutter, Sargent's list.	60¢@10¢
Wt'r Sunk Flush, Sargent's list.	55¢@10¢
Wt'r Sunk Flush, Stanley's list.	55¢@10¢
Wt'r B.K. Flush, Com'n.	55¢@10¢

Carriage, Machine, &c.—

Com. list June 10, '84.	70¢@12¢@25¢
Genuine Eagle, list Oct. '84.	75¢@10¢@80¢
Phila. pattern, list Oct. '74.	80¢@80¢@10¢
R.B.&W., old list.	70¢
Machine.	
Bolt Ends.	

Tire—

Common, list Feb. 28, '83.	67¢@67¢
Port Chester Bolt and Nut Company.	
Empire, list Feb. 28, '83.	67¢@67¢
Keystone, Philadel., list Oct. '84.	80¢
Norway, Phila., list Oct. '84.	75¢
American Screw Company:	
Norway, Phil., list Oct. 16, '84.	75¢
Eagle, Phil., list Oct. 16, '84.	80¢
Philadel., list Oct. 16, '84.	80¢
Bay State, list Feb. 28, '83.	67¢@67¢
R.B.&W., Philadel., list Oct. 16, '84.	80¢

Stove and Plow—

Stove.	62¢@62¢
Plow.	60¢@55¢
R. B. & W., Plow.	55¢

Cards—

Horse & Curry.....10¢10¢10¢10¢
 Cotton.....10¢10¢10¢
 Wool.....10¢10¢10¢

Carpet Stretchers—

Cast Steel, Polished.....\$ doz \$2.25
 Cast Iron, Steel Points.....\$ doz \$2.00
 Socket.....\$ doz \$1.75
 Bullard's.....\$ doz \$2.50

Carpet Sweepers—

Rissell No. 5.....\$ doz \$17.00
 Rissell No. 7 New Drop Pan.....\$ doz \$18.00
 Rissell, Grand.....\$ doz \$36.00
 Grand Rapids.....\$ doz \$24.00
 Crown Jewel, No. 1, \$18.00; No. 2, \$20.00
 Magic.....\$ doz \$15.00
 Jewel.....\$ doz \$17.00

Improved Parlor Queen,

Nickel.....\$ doz \$27.00
 Japanned.....\$ doz \$24.00
 Excelior.....\$ doz \$22.00
 Garland.....\$ doz \$18.00
 arlor Queen.....\$ doz \$24.00
 Housewife's Delight.....\$ doz \$15.00
 Queen.....\$ doz \$18.00
 Queen, with band.....\$ doz \$18.00
 King.....\$ doz \$30.00
 Weed, Improved.....\$ doz \$18.00
 Hub.....\$ doz \$16.00
 Cog-Wheel.....\$ doz \$16.00
 Conqueror.....\$ doz \$22.00
 Easy.....\$ doz \$22.00
 Monarch.....\$ doz \$22.00
 Goshen.....\$ doz \$21.00
 Advance.....\$ doz \$18.00
 Ladies' Friend, No. 1, \$ doz, \$15.00; No. 2, \$ doz, \$16.00
 American.....\$ doz \$36.00
 Grand Republic.....\$ doz \$36.00

Cartridges—

See Ammunition.

Casters—

Bed.....\$ doz \$55¢55¢19¢
 Plate.....\$ doz \$60¢60¢10¢
 Shallow Socket.....\$ doz \$40¢10¢
 Deep Socket.....\$ doz \$40¢10¢
 Yale Casters, list May, 1884.....\$ doz \$40¢10¢
 Yale, Gem.....\$ doz \$60¢60¢5¢
 Martin's Patent (Phoenix).....\$ doz \$60¢60¢5¢
 Payson's Anti-Friction.....\$ doz \$60¢60¢10¢
 Giant Truck Casters.....\$ doz \$30¢
 Stationary Truck Casters.....\$ doz \$60¢10¢
 Socket Truck Casters.....\$ doz \$50¢

Cattle Leaders—

Humason & Beckley & Co.'s.....\$ doz \$70¢
 Sargent's.....\$ doz \$66¢10¢
 Hotchkiss.....\$ doz \$30¢
 Peck, Stow & W. Co.....\$ doz \$60¢10¢

Chain—

Trace, 3/4-10-2, exact.....\$ pair \$1.03
 Trace, 3/4-10-3, exact.....\$ pair \$2.05
 Trace, 7-10-2, exact.....\$ pair \$1.11
 Trace, 7-10-3, exact.....\$ pair \$1.11
 Log, Fitch, Stretcher, and other fancy Chains, list Nov. 1, 1884.....\$ pair \$1.11

American Coil, in cask lots, 3-16 3/4, 5-16 3/4, 7-16 3/4, 9-16 3/4, 11-16 3/4, 13-16 3/4, 15-16 3/4, 17-16 3/4, 19-16 3/4, 21-16 3/4, 23-16 3/4, 25-16 3/4, 27-16 3/4, 29-16 3/4, 31-16 3/4, 33-16 3/4, 35-16 3/4, 37-16 3/4, 39-16 3/4, 41-16 3/4, 43-16 3/4, 45-16 3/4, 47-16 3/4, 49-16 3/4, 51-16 3/4, 53-16 3/4, 55-16 3/4, 57-16 3/4, 59-16 3/4, 61-16 3/4, 63-16 3/4, 65-16 3/4, 67-16 3/4, 69-16 3/4, 71-16 3/4, 73-16 3/4, 75-16 3/4, 77-16 3/4, 79-16 3/4, 81-16 3/4, 83-16 3/4, 85-16 3/4, 87-16 3/4, 89-16 3/4, 91-16 3/4, 93-16 3/4, 95-16 3/4, 97-16 3/4, 99-16 3/4, 101-16 3/4, 103-16 3/4, 105-16 3/4, 107-16 3/4, 109-16 3/4, 111-16 3/4, 113-16 3/4, 115-16 3/4, 117-16 3/4, 119-16 3/4, 121-16 3/4, 123-16 3/4, 125-16 3/4, 127-16 3/4, 129-16 3/4, 131-16 3/4, 133-16 3/4, 135-16 3/4, 137-16 3/4, 139-16 3/4, 141-16 3/4, 143-16 3/4, 145-16 3/4, 147-16 3/4, 149-16 3/4, 151-16 3/4, 153-16 3/4, 155-16 3/4, 157-16 3/4, 159-16 3/4, 161-16 3/4, 163-16 3/4, 165-16 3/4, 167-16 3/4, 169-16 3/4, 171-16 3/4, 173-16 3/4, 175-16 3/4, 177-16 3/4, 179-16 3/4, 181-16 3/4, 183-16 3/4, 185-16 3/4, 187-16 3/4, 189-16 3/4, 191-16 3/4, 193-16 3/4, 195-16 3/4, 197-16 3/4, 199-16 3/4, 201-16 3/4, 203-16 3/4, 205-16 3/4, 207-16 3/4, 209-16 3/4, 211-16 3/4, 213-16 3/4, 215-16 3/4, 217-16 3/4, 219-16 3/4, 221-16 3/4, 223-16 3/4, 225-16 3/4, 227-16 3/4, 229-16 3/4, 231-16 3/4, 233-16 3/4, 235-16 3/4, 237-16 3/4, 239-16 3/4, 241-16 3/4, 243-16 3/4, 245-16 3/4, 247-16 3/4, 249-16 3/4, 251-16 3/4, 253-16 3/4, 255-16 3/4, 257-16 3/4, 259-16 3/4, 261-16 3/4, 263-16 3/4, 265-16 3/4, 267-16 3/4, 269-16 3/4, 271-16 3/4, 273-16 3/4, 275-16 3/4, 277-16 3/4, 279-16 3/4, 281-16 3/4, 283-16 3/4, 285-16 3/4, 287-16 3/4, 289-16 3/4, 291-16 3/4, 293-16 3/4, 295-16 3/4, 297-16 3/4, 299-16 3/4, 301-16 3/4, 303-16 3/4, 305-16 3/4, 307-16 3/4, 309-16 3/4, 311-16 3/4, 313-16 3/4, 315-16 3/4, 317-16 3/4, 319-16 3/4, 321-16 3/4, 323-16 3/4, 325-16 3/4, 327-16 3/4, 329-16 3/4, 331-16 3/4, 333-16 3/4, 335-16 3/4, 337-16 3/4, 339-16 3/4, 341-16 3/4, 343-16 3/4, 345-16 3/4, 347-16 3/4, 349-16 3/4, 351-16 3/4, 353-16 3/4, 355-16 3/4, 357-16 3/4, 359-16 3/4, 361-16 3/4, 363-16 3/4, 365-16 3/4, 367-16 3/4, 369-16 3/4, 371-16 3/4, 373-16 3/4, 375-16 3/4, 377-16 3/4, 379-16 3/4, 381-16 3/4, 383-16 3/4, 385-16 3/4, 387-16 3/4, 389-16 3/4, 391-16 3/4, 393-16 3/4, 395-16 3/4, 397-16 3/4, 399-16 3/4, 401-16 3/4, 403-16 3/4, 405-16 3/4, 407-16 3/4, 409-16 3/4, 411-16 3/4, 413-16 3/4, 415-16 3/4, 417-16 3/4, 419-16 3/4, 421-16 3/4, 423-16 3/4, 425-16 3/4, 427-16 3/4, 429-16 3/4, 431-16 3/4, 433-16 3/4, 435-16 3/4, 437-16 3/4, 439-16 3/4, 441-16 3/4, 443-16 3/4, 445-16 3/4, 447-16 3/4, 449-16 3/4, 451-16 3/4, 453-16 3/4, 455-16 3/4, 457-16 3/4, 459-16 3/4, 461-16 3/4, 463-16 3/4, 465-16 3/4, 467-16 3/4, 469-16 3/4, 471-16 3/4, 473-16 3/4, 475-16 3/4, 477-16 3/4, 479-16 3/4, 481-16 3/4, 483-16 3/4, 485-16 3/4, 487-16 3/4, 489-16 3/4, 491-16 3/4, 493-16 3/4, 495-16 3/4, 497-16 3/4, 499-16 3/4, 501-16 3/4, 503-16 3/4, 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671-16 3/4, 673-16 3/4, 675-16 3/4, 677-16 3/4, 679-16 3/4, 681-16 3/4, 683-16 3/4, 685-16 3/4, 687-16 3/4, 689-16 3/4, 691-16 3/4, 693-16 3/4, 695-16 3/4, 697-16 3/4, 699-16 3/4, 701-16 3/4, 703-16 3/4, 705-16 3/4, 707-16 3/4, 709-16 3/4, 711-16 3/4, 713-16 3/4, 715-16 3/4, 717-16 3/4, 719-16 3/4, 721-16 3/4, 723-16 3/4, 725-16 3/4, 727-16 3/4, 729-16 3/4, 731-16 3/4, 733-16 3/4, 735-16 3/4, 737-16 3/4, 739-16 3/4, 741-16 3/4, 743-16 3/4, 745-16 3/4, 747-16 3/4, 749-16 3/4, 751-16 3/4, 753-16 3/4, 755-16 3/4, 757-16 3/4, 759-16 3/4, 761-16 3/4, 763-16 3/4, 765-16 3/4, 767-16 3/4, 769-16 3/4, 771-16 3/4, 773-16 3/4, 775-16 3/4, 777-16 3/4, 779-16 3/4, 781-16 3/4, 783-16 3/4, 785-16 3/4, 787-16 3/4, 789-16 3/4, 791-16 3/4, 793-16 3/4, 795-16 3/4, 797-16 3/4, 799-16 3/4, 801-16 3/4, 803-16 3/4, 805-16 3/4, 807-16 3/4, 809-16 3/4, 811-16 3/4, 813-16 3/4, 815-16 3/4, 817-16 3/4, 819-16 3/4, 821-16 3/4, 823-16 3/4, 825-16 3/4, 827-16 3/4, 829-16 3/4, 831-16 3/4, 833-16 3/4, 835-16 3/4, 837-16 3/4, 839-16 3/4, 841-16 3/4, 843-16 3/4, 845-16 3/4, 847-16 3/4, 849-16 3/4, 851-16 3/4, 853-16 3/4, 855-16 3/4, 857-16 3/4, 859-16 3/4, 861-16 3/4, 863-16 3/4, 865-16 3/4, 867-16 3/4, 869-16 3/4, 871-16 3/4, 873-16 3/4, 875-16 3/4, 877-16 3/4, 879-16 3/4, 881-16 3/4, 883-16 3/4, 885-16 3/4, 887-16 3/4, 889-16 3/4, 891-16 3/4, 893-16 3/4, 895-16 3/4, 897-16 3/4, 899-16 3/4, 901-16 3/4, 903-16 3/4, 905-16 3/4, 907-16 3/4, 909-16 3/4, 911-16 3/4, 913-16 3/4, 915-16 3/4, 917-16 3/4, 919-16 3/4, 921-16 3/4, 923-16 3/4, 925-16 3/4, 927-16 3/4, 929-16 3/4, 931-16 3/4, 933-16 3/4, 935-16 3/4, 937-16 3/4, 939-16 3/4, 941-16 3/4, 943-16 3/4, 945-16 3/4, 947-16 3/4, 949-16 3/4, 951-16 3/4, 953-16 3/4, 955-16 3/4, 957-16 3/4, 959-16 3/4, 961-16 3/4, 963-16 3/4, 965-16 3/4, 967-16 3/4, 969-16 3/4, 971-16 3/4, 973-16 3/4, 975-16 3/4, 977-16 3/4, 979-16 3/4, 981-16 3/4, 983-16 3/4, 985-16 3/4, 987-16 3/4, 989-16 3/4, 991-16 3/4, 993-16 3/4, 995-16 3/4, 997-16 3/4, 999-16 3/4, 1001-16 3/4, 1003-16 3/4, 1005-16 3/4, 1007-16 3/4, 1009-16 3/4, 1011-16 3/4, 1013-16 3/4, 1015-16 3/4, 1017-16 3/4, 1019-16 3/4, 1021-16 3/4, 1023-16 3/4, 1025-16 3/4, 1027-16 3/4, 1029-16 3/4, 1031-16 3/4, 1033-16 3/4, 1035-16 3/4, 1037-16 3/4, 1039-16 3/4, 1041-16 3/4, 1043-16 3/4, 1045-16 3/4, 1047-16 3/4, 1049-16 3/4, 1051-16 3/4, 1053-16 3/4, 1055-16 3/4, 1057-16 3/4, 1059-16 3/4, 1061-16 3/4, 1063-16 3/4, 1065-16 3/4, 1067-16 3/4, 1069-16 3/4, 1071-16 3/4, 1073-16 3/4, 1075-16 3/4, 1077-16 3/4, 1079-16 3/4, 1081-16 3/4, 1083-16 3/4, 1085-16 3/4, 1087-16 3/4, 1089-16 3/4, 1091-16 3/4, 1093-16 3/4, 1095-16 3/4, 1097-16 3/4, 1099-16 3/4, 1101-16 3/4, 1103-16 3/4, 1105-16 3/4, 1107-16 3/4, 1109-16 3/4, 1111-16 3/4, 1113-16 3/4, 1115-16 3/4, 1117-16 3/4, 1119-16 3/4, 1121-16 3/4, 1123-16 3/4, 1125-16 3/4, 1127-16 3/4, 1129-16 3/4, 1131-16 3/4, 1133-16 3/4, 1135-16 3/4, 1137-16 3/4, 1139-16 3/4, 1141-16 3/4, 1143-16 3/4, 1145-16 3/4, 1147-16 3/4, 1149-16 3/4, 1151-16 3/4, 1153-16 3/4, 1155-16 3/4, 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1619-16 3/4, 1621-16 3/4, 1623-16 3/4, 1625-16 3/4, 1627-16 3/4, 1629-16 3/4, 1631-16 3/4, 1633-16 3/4, 1635-16 3/4, 1637-16 3/4, 1639-16 3/4, 1641-16 3/4, 1643-16 3/4, 1645-16 3/4, 1647-16 3/4, 1649-16 3/4, 1651-16 3/4, 1653-16 3/4, 1655-16 3/4, 1657-16 3/4, 1659-16 3/4, 1661-16 3/4, 1663-16 3/4, 1665-16 3/4, 1667-16 3/4, 1669-16 3/4, 1671-16 3/4, 1673-16 3/4, 1675-16 3/4, 1677-16 3/4, 1679-16 3/4, 1681-16 3/4, 1683-16 3/4, 1685-16 3/4, 1687-16 3/4, 1689-16 3/4, 1691-16 3/4, 1693-16 3/4, 1695-16 3/4, 1697-16 3/4, 1699-16 3/4, 1701-16 3/4, 1703-16 3/4, 1705-16 3/4, 1707-16 3/4, 1709-16 3/4, 1711-16 3/4, 1713-16 3/4, 1715-16 3/4, 1717-16 3/4, 1719-16 3/4, 1721-16 3/4, 1723-16 3/4, 1725-16 3/4, 1727-16 3/4,

Melasses Gates—

Stebbin's Pattern.....	75¢@75¢10¢
Stebbin's Genuine.....	60¢@10¢10¢
Stebbin's Tinned Ends.....	40¢10¢
Chase's Hard Metal.....	50¢10¢
Bush's.....	20¢
Lincoln's Eastern.....	70¢@10¢
Weed's.....	20¢10¢

Boss, # doz:

Nos. 1, 7; No. 2, 8; No. 3, 9; No. 4, 10.....	60¢@10¢10¢
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Money Drawers.....# doz, \$18¢@20¢**Muzzles—**

Safety.....	# doz, \$3.00, 25¢
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Nails, see Trade Report.

Wire Nails, Papered.....	70¢@5¢
Association list, July 15, 1889.....	70¢@5¢
Tack Mfrs' list.....	60¢@10¢10¢
Wire Nails, Standard Penny.....	30¢@10¢
Card, June 1, '89, base.....	\$3.00 @ \$3.10

Nail Puller—

Curtis Hammer.....	# doz \$9.00
Giant, No. 1.....	# doz \$15.00, 10¢
Giant, No. 2.....	# doz \$15.00, 10¢
Pelican.....	# doz \$9.00, 25¢

Nail Sets—

Square.....	# gr, \$4.00@4.25
Round.....	# gr, \$3.25
Buck Bros.....	# gr, \$3.25
Cannon's Diamond Point.....	# gr, \$12, 20¢

Nut Crackers—

Table (H. & B. Mfg. Co.).....	40¢
Blake's Pattern.....	# doz \$2.00, 10¢
Turner & Seymour Mfg. Co.....	50¢

Nuts—

Nuts, off list Dec. 18, 1889: Square. Hex. Hot Pressed.....	5¢
Cold Punched.....	5¢
In lots less than 100 lb. #, add 1/4¢; 1-lb boxes, add 1¢ to list.	

Oakum—

Government.....	# 7 1/2¢@7 1/4¢
U. S. Navy.....	# 6 1/2¢@6 1/4¢
Navy.....	# 5 1/2¢@5 1/4¢

Oilers—

Zinc and Tin.....	65¢@65¢10¢
Brass and Copper.....	50¢@10¢50¢10¢50¢
Malleable, Hammers Improved, No. 1, \$3.00; No. 2, \$4.00; No. 3, \$4.40 # doz.....	10¢@10¢50¢

Malleable, Hammers, Old Pattern, same list.....	40¢
Prior's Pat. or "Paragon" Zinc.....	60¢@10¢10¢

Prior's Pat. or "Paragon" Brass.....	50¢
Olmsstead's Tin and Zinc.....	60¢
Olmsstead's Brass and Copper.....	50¢
Broughton's Zinc.....	60¢
Broughton's Brass.....	50¢
Gem P. D. & Co.....	# gro. \$2

Packing, Steam—

Standard.....	60¢@10¢60¢10¢10¢
Extra.....	50¢@10¢60¢
N. Y. B. & P. Co., Standard.....	50¢@10¢50¢
N. Y. B. & P. Co., Empire.....	70¢
N. Y. B. & P. Co., Salamander.....	# 65¢, 30¢
Jenkins' Standard.....	# 80¢, 35¢

Miscellaneous—

American Packing.....	10¢@11¢
Russia Packing.....	14¢
Italian Packing.....	13¢@14¢
Cotton Packing.....	15¢@17¢
Jute.....	7¢@8¢

Padlocks—

See Locks.....	7¢@8¢
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Pails—

Galvanized Iron—See Trade Report	
Quarts.....	10 12 14
Hill's Light Weight, # doz.....	\$2.75 3.00 3.25 3.75
Hill's Heavy Weight, # da.....	3.00 3.25 3.75
Whiting's.....	2.75 3.00 3.25
Sidney Sheppard & Co.....	2.94 3.15 3.27
Iron Clad.....	2.50 2.75 3.00
Fire Buckets.....	2.75 3.25 3.50
Buckets, see Well Buckets.....	

Indurated Fibre Ware—25¢

Star Pails, 12 qt., # doz.....	\$2.00
Fire Pails, 12 qt., # doz.....	\$2.00
Star Pails, 14 qt., # doz.....	\$2.00
Fire Pails, 14 qt., # doz.....	\$2.00
Star Pails, 16 qt., # doz.....	\$2.00
Fire Pails, 16 qt., # doz.....	\$2.00
Star Pails, 18 qt., # doz.....	\$2.00
Fire Pails, 18 qt., # doz.....	\$2.00
Star Pails, 20 qt., # doz.....	\$2.00
Fire Pails, 20 qt., # doz.....	\$2.00

Standard Fibre Ware—

Water Pails, 12 qt., per doz.....	\$4.50
Dairy Pails, 14 qt., per doz.....	4.50
Fire Pails, No. 1, 12 qt., per doz.....	4.50
Fire Pails, No. 2, 14 qt., per doz.....	5.00
Sugar Pails.....	6.00
Horse Pails.....	5.00
Buggy Pails.....	5.00
Slop Jars (bal. trap).....	8.00
Chamber Pails, 14 qt.....	6.50

Pencils—

Faber's Carpenters'.....	high list 50¢
Faber's Round Gilt.....	# gro \$5.25
Dixon's Lead.....	# gro \$4.50
Dixon's Lumber.....	# gro \$6.75
Dixon's Carpenters'.....	40¢@10¢

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....	60¢ @ 60¢5¢
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Picture Nails—

Brass Head, Sargent's list.....	50¢@10¢10¢
Brass Head, Combination list.....	50¢@10¢
Porcelain Head, Sargent's list.....	50¢@10¢10¢
Porcelain Head, Combination list.....	40¢@10¢
Niles' Patent.....	40¢

Pinking Irons—

# doz 65¢ net	
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Pipe, Wrought Iron—

List September 18, 1889.....	50¢
1 1/2 and under, Plain.....	50¢
1 1/2 and under, Galvanized.....	42¢@4¢
1 1/2 and over, Plain.....	62¢@4¢
1 1/2 and over, Galvanized.....	50¢
Boiler Tubes, Iron.....	50¢
1 1/2 and under.....	50¢
2 in. and larger.....	55¢

Planes and Plane Irons—

Wood Planes—	
Molding.....	45¢@25¢
Bench, First Quality.....	55¢@25¢
Bench, Second Quality.....	60¢@25¢
Bailey's (Stanley R. & L. Co.).....	40¢@10¢

Iron Planes—

Bailey's (Stanley R. & L. Co.).....	40¢@10¢
Miscellaneous Planes (Stanley R. & L. Co.).....	20¢@10¢
Victor Planes (Stanley R. & L. Co.).....	20¢@10¢
Steer's Iron Planes.....	35¢@25¢
Meriden Mail Iron Co.'s.....	30¢@10¢30¢10¢10¢
Davis's Iron Planes.....	30¢@10¢30¢10¢10¢

Birmingham Plane Co.....	50¢@50¢5¢
Gage Tool Co.'s Self-Setting.....	30¢10¢
Chaplin's Iron Planes.....	40¢@40¢5¢
Sargent's.....	30¢@10¢30¢10¢10¢

Plane Irons—

Plane Irons, Butcher's.....	\$5.00@5.25 to 5
Plane Irons, Buck Bros.....	30¢
Plane Irons, Auburn Tool Co., "This- tle".....	35¢

Sandusky Tool Co.:—

Single and Cut.....	30¢
Double.....	40¢
L. & J. White.....	25¢

Pliers and Nippers—

Button's Patent.....	30¢@10¢40¢
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 # doz.....	30¢@10¢33¢45¢
Humason & Beckley Mfg. Co.....	50¢@50¢10¢
Gas Pliers.....	60¢
Gas Pliers, Custar's Nickel Plated.....	60¢55¢
Eureka Pliers and Nippers.....	40¢
Russell's Parallel.....	25¢
P. S. & W. Cast Steel.....	50¢
P. S. & W. Thinners' Cutting Nippers.....	add 6¢ dis 10¢
Carew's Pat. Wire Cutters.....	30¢55¢
Morrill's Parallel, # doz, \$12.00.....	30¢55¢
Cronk's 8 in., \$15.00; 10 in., \$21.00.....	40¢@40¢5¢

Plumbs and Levels—

Regular List.....	70¢@10¢70¢10¢10¢
Diston's.....	45¢10¢
Pocket Levels.....	70¢@10¢70¢10¢10¢
Davis Iron Levels.....	30¢
Davis' Inclinoimeters.....	10¢@10¢

Polish, Metal.

Prestoline.....	30¢10¢
Prestoline Paste.....	33¢45¢
Gaston's Silver Compound.....	33¢45¢

Pokes, Animal—

Bishop's I. X. L.....	# doz \$6.00
Bishop's O. K.....	# doz \$5.25
Bishop's Pioneer.....	# doz \$3.75
Bishop's American.....	# doz \$2.75

Peppers, Corn—

Round or Square, 1 qt., # gr.....	\$10.00@10.50
Round or Square, 1 1/2 qt., # gr.....	\$15.00@15.50
Round or Square, 2 qt., # gr.....	\$18.50@19.00

Post Hole and Tree Augers and Diggers—	
Samson Post Hole Digger, # doz.....	\$36.00
Fletcher Post Hole Augers.....	\$36, 20¢
Eureka Diggers.....	# doz \$16.00@17.00
Leed's.....	# doz \$8.00@9.00
Vaughan's Post Hole Auger, # doz.....	\$13.00@14.00
Kohler's Little Giant.....	# doz \$18.00
Kohler's Hercules.....	# doz \$15.00
Kohler's New Champion.....	# doz \$9.00
Schneider.....	# doz \$15.00
Ryan's Post Hole Digger.....	# doz \$24.00
Cronk's Post Bars, # doz.....	\$60.00
Gibbs Post Hole Digger, # doz.....	\$30.00, 50¢
Imperial, # doz, \$15.....	45¢

Potato Parers—

White Mountain.....	# doz \$5.00@5.50
Antrim Combination.....	# doz \$8.00
Hoosier.....	# doz \$13.50

Pruning Hooks and Shears—	
Disston's Combined Pruning Hook and Saw.....	# doz \$18.00, 20¢@10¢
Disston's Pruning Hook, # doz.....	\$12.00
E. S. Lee & Co.'s Pruning Tools.....	20¢@10¢
Pruning Shears, Henry's Pat., # doz.....	\$3.75@4.00 net
Henry's Pruning Shears, # doz.....	\$4.25@4.50 net
Wheeler, M. & C. Co.'s Combination.....	# doz \$12.00, 20¢
Dunlap's Saw and Chisel.....	# doz \$5.50, 30¢
J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25; P. S. & W. Co.....	60¢

Pallevs—

Hot House, Awning, &c.....	60¢@10¢
Japanned Screw.....	60¢@10¢
Japanned Slide.....	60¢@10¢
Japanned Clothes Line.....	60¢@10¢
Empire Sash Pulley.....	55¢@60¢
Moore's Sash, Anti-Friction.....	50¢
Hay Fork, Solid Eye, # doz.....	\$4.50
Hay Fork, "Anti-Friction," 5 in. Solid.....	\$5.70
Hay Fork, "Common and Pat.....	20¢
Hay Fork, Tarbox Pat. Iron.....	20¢
Hay Fork, Reed's Lubricating.....	60¢
Shade Rack.....	45¢
Tackle Blocks.....	See Blocks
Moore's Anti-Friction 5 in. Wheel, # doz.....	\$12.00

Pumps—

Cistern, Best Makers.....	60¢@10¢10¢
Pitcher Spout, Best Makers.....	67¢@70¢
Pitcher Spout, Cheaper Goods.....	70¢@70¢5¢

Punches—

Saddlers' or Drive, good, # doz.....	60¢@65¢
Bemis & Call Co.'s Cast Steel Drive.....	50¢55¢
Bemis & Call Co.'s Springfield Socket.....	50¢55¢
Spring, good quality.....	# doz \$2.50@2.60
Bemis & Call Co.'s Spring and Check.....	40¢
Solid Tinner's, P. S. & W. Co., # doz.....	\$1.44, 55¢
Tin's Hollow Punches P. S. & W. Co.....	20¢@2¢
Rice Hand Punches.....	15¢
Avery's Revolving.....	40¢
Avery's Saw-Set and Punch, See Saw Sets.....	

Rail—

Sliding Door, Wrt Brass, # 35¢.....	15¢
Sliding Door, Wrt Br Iron.....	# ft. 7¢
Sliding Door, Iron, Painted, # foot.....	4¢, 40¢
Barn Door, Light, in.....	3/4 3/4
Per 100 feet.....	\$2.00 2.50 3.10; 10¢
B. D. for N. E. Hangers.....	
Small, Med. Large.....	\$2.15 2.70 3.25 net
Per 100 feet.....	\$2.15 2.70 3.25 net
Terry's Steel Rail, # foot.....	4¢
Victor Track Rail, 7 1/2 # foot.....	50¢@5¢
Carrier Steel Rail, # foot.....	4¢
Moore's Wrought Iron.....	25¢

Rakes—

Cast Steel, Association goods.....	70¢
Cast Steel, outside goods.....	60¢@10¢70¢
Malleable.....	70¢@45¢
Gibbs Lawn Rake.....	\$12.00, 50¢15¢
Canton Lawn Rake.....	\$9.00, 50¢10¢
Fort Madison Prize Bow Rake and Peerless.....	65¢

Fort Madison Steel Tooth Lawn Rake, \$6.00.....	25¢
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Razors—

J. R. Torrey Razor Co.....	20¢
Wootenholme and Butcher, \$10.00 to 5.....	10¢

Jordan's A.A. 1, list Nov. 1, 1889.....	50¢
Jordan's Old Faithful, list Nov. 1, '89.....	50¢
Electric.....	List net

Razor Straps—

Genuine Emerson.....	60¢@60¢5¢
Imitation.....	# doz \$2.00, 20¢@10¢5¢
Torrey's.....	30¢
Badger's Belt and Com.....	# doz \$2.00
Lamont Combination.....	# doz \$4.00
Jordan's Pat. Padded, list Nov. 1, '89.....	50¢
Electric.....	List net

Rivets and Burrs—

Iron, list Nov. 17, '87.....	40¢
Copper.....	50¢@50¢10¢

Rivet Sets.....

Rods—	
Stair, Brass.....	25¢25¢
Stair, Black Walnut.....	# doz 40¢

Rollers—

Barn Door, Sargent's list.....	60¢@10¢10¢
Acme Moore's Anti-Friction.....	55¢
Union Barn Door Roller.....	70¢

Rope—

Manufacturers' prices:	
Manilla, 1/4 in. and larger.....	# 14¢
Manilla, 1/2 in. and larger.....	# 15¢
Manilla, 3/4 in. and larger.....	# 16¢
Manilla, 1 in. and larger.....	# 17¢
Manilla, 1 1/4 in. and larger.....	# 18¢
Manilla, 1 1/2 in. and larger.....	# 19¢
Manilla, 1 3/4 in. and larger.....	# 20¢
Manilla, 2 in. and larger.....	# 21¢
Manilla, 2 1/4 in. and larger.....	# 22¢
Manilla, 2 1/2 in. and larger.....	# 23¢
Manilla, 2 3/4 in. and larger.....	# 24¢
Manilla, 3 in. and larger.....	# 25¢
Manilla, 3 1/4 in. and larger.....	# 26¢
Manilla, 3 1/2 in. and larger.....	# 27¢
Manilla, 3 3/4 in. and larger.....	# 28¢
Manilla, 4 in. and larger.....	# 29¢
Manilla, 4 1/4 in. and larger.....	# 30¢
Manilla, 4 1/2 in. and larger.....	# 31¢
Manilla, 4 3/4 in. and larger.....	# 32¢
Manilla, 5 in. and larger.....	# 33¢
Manilla, 5 1/4 in. and larger.....	# 34¢
Manilla, 5 1/2 in. and larger.....	# 35¢
Manilla, 5 3/4 in. and larger.....	# 36¢
Manilla, 6 in. and larger.....	# 37¢
Manilla, 6 1/4 in. and larger.....	# 38¢
Manilla, 6 1/2 in. and larger.....	# 39¢
Manilla, 6 3/4 in. and larger.....	# 40¢
Manilla, 7 in. and larger.....	# 41¢
Manilla, 7 1/4 in. and larger.....	# 42¢
Manilla, 7 1/2 in. and larger.....	# 43¢
Manilla, 7 3/4 in. and larger.....	# 44¢
Manilla, 8 in. and larger.....	# 45¢
Manilla, 8 1/4 in. and larger.....	# 46¢
Manilla, 8 1/2 in. and larger.....	# 47¢
Manilla, 8 3/4 in. and larger.....	# 4

Machines—	
Flat Head, Iron.....	55%
Round Head, Iron.....	50%
Bench and Hand—	
Bench, Iron.....	55%10¢55¢10¢10%
Bench, Wood, Beech.....	75¢
Bench, Wood, Hickory.....	20¢10%
Lag, Blunt Point, according to size.....	25¢10¢25¢10¢5%
Coach and Lag, Gimlet Point.....	75%
Bed.....	25¢5%
Hand Rail, Sargent's.....	60¢10¢10%
Hand Rail, H. & B. Mfg. Co.....	70¢10¢75%
Hand Rail, Am. Screw Co.....	75%
Jack Screws, Millers Falls list.....	50¢50¢5%
Jack Screws, P. & W.....	35%
Jack Screws, Sargent.....	60¢10¢60¢10¢5%
Jack Screws, Stearns.....	40¢40¢10%

Scroll Saws—	
Leater, complete, \$10.00.....	25%
Rogers, complete, \$4.00.....	25%
Barnes' Builders' and Cabinet Makers'.....	\$15.....
Barnes' Scroll Saws.....	35%

Scythe Snaths.....	50¢52¢20¢10¢2%
Shears—	
American (Cast) Iron.....	75¢10¢75¢10¢5%
Pruning.....	See Pruning Hooks and Shears
Barnard's Lamp Trimmers.....	75¢
Timmers.....	20¢2%
Seymour's, List, Dec. 1881.....	60¢10¢10¢60¢10¢10¢5%
Heinisch's, List, Dec. 1881.....	60¢10¢10¢60¢10¢10¢5%
Heinisch's Tailor's Shears.....	39¢4%
First quality C. S. Trimmers.....	80¢80¢10%
Second quality C. S. Trimmers.....	80¢10¢80¢10¢10%

Acme Cast Shears.....	10¢10%
Diamond Cast Shears.....	10¢10%
Clippers.....	10¢10%
Victor Cast Shears.....	75¢10¢75¢10¢5%
Howe Bros. & Hulbert, Solid Forged Steel.....	40%
Chicago Drop Forge & F. Co., Solid Steel Forged.....	70%
Clausen Shear Co., Japanese.....	70%
Clausen Shear Co., Nickleod, same list.....	60%
Electric.....	List net

Sliding Door—	
M. W. Co., list July, 1888.....	50¢10¢60¢5%
R. & E., list Dec. 18, 1888.....	60¢10¢2%
Corbin's list.....	60¢10¢2%
Patent Roller.....	60¢10¢2%
Patent Roller, Hatfield's.....	75%
Russell's Anti-Friction, list Dec. 18, 1888.....	60¢2%
Moore's Anti-Friction.....	50%

Sliding Shutter—	
R. & E., list Dec. 18, 1888.....	60¢10¢2%
Sargent's list.....	60¢10%
Reading list.....	60¢10¢10%

Ship Tools—	
L. & J. White.....	20¢5%
Albertson Mfg. Co.....	35%

Shoes, Horse, Mule, &c.—	
Burden's, Perkins', Phoenix, at factory.....	\$4.00

Mule—	
Add \$1 per keg to above prices.	

Or, Wrought—	
Ton lots.....	75¢
1000 lb lots.....	75¢
500 lb lots.....	75¢

Shot—	
Drop, 3 bag, 25 lb.....	\$1.19
Drop, 3 bag, 5 lb.....	.29
Buck and Chilled, 75 lb bag.....	1.44
Buck and Chilled, 5 lb bag.....	.34

Shovels and Spades—	
Ames' Shovels, Spades, &c., list Nov. 1, 1888.....	25%
NOTE.—Jobbers frequently give 5¢ to 7% extra on above.	

Griffith's Black Iron.....	60¢10%
Griffith's C. S.....	60¢10%
Griffith's Solid C. S. R. R. Goods.....	20%
Old Colony (Sanford Fork & Tool Co.) 35¢	
St. Louis Shovel Co.....	30¢30¢75%
Hussey, Binn & Co.....	15¢25%
Hubbard & Co.....	30¢20¢75%
Lehigh Mfg. Co.....	60¢10%
Payne Telephone & Son, list January, 1888.....	30%
Remington's (Lowman's) Pat. 30¢10¢40%	
Rowland's, Black Iron.....	60¢10%
Rowland's Steel.....	60¢5¢60¢10%

Shovels and Tongs—	
Iron Head.....	60¢10¢60¢10¢5%
Steele Head.....	60¢10¢10%

Skins, Thimble—	
Western list.....	75¢5¢75¢10%
Columbus Wrt. Steel, list Jan. 3, 1889.....	45¢10%

Stoves—	
Coldbrookdale Iron Co.....	60¢10%
Utica P. S. T. Skins.....	60%
Utica Turned and Fitted.....	35%

Stoves—	
Buffalo Metallic, S. & Co.....	50¢25%
Shaker (Barber's) Pat. Flour Sifters.....	75¢20¢10%
Electric.....	75¢18.00
Hunter's.....	75¢20.00
Smith's Adjustable Sifters.....	75¢20.00
Smith's Adjustable Milk Strainer.....	75¢20.00
Smith's Adjustable T. & C. Strainer.....	75¢20.00

Stoves, Wooden Rim—	
Iron. Plated.....	75¢
Mesh 18, Nested, 75 lbs.....	95¢
Mesh 20, Nested, 75 lbs.....	95¢
Mesh 24, Nested, 75 lbs.....	1.10

Slaters—	
School, by case.....	50¢50¢10%

Stamps, Harness, &c.—	
Anchor (C. & S. Mfg. Co.).....	65%
Fitch's (Bristol).....	60¢10%
Hotchkiss.....	10%
Andrews.....	50%
Sargent's Patent Guarded.....	70¢10¢10%
German, new list.....	60¢10%
Covered, New Patent.....	50¢25%
Covered, New R. E.....	60¢10¢10%
Covered Spring.....	60¢10¢10%

Soldering Irons—	
Soldering Copper.....	22¢23¢
Cover's Adjustable, list Jan. 1, 1889.....	35¢25%

Spittoons, Cuspidors, &c.—	
Standard Fiberglass.....	25%
Cuspidors, 8½-inch, No. 5, 88; No. 5X 89.....	25%
Spittoons, Daisy, 8-inch, No. 1, 84; 10 and 11 l. ch. 89.....	25%

Spoke Shaves—

Iron.....	45%
Wood.....	30%
Bailey's (Stanley R. & L. Co.).....	40¢10%
Stearns.....	50¢10¢30%
Cincinnati.....	25¢10%

Spoke Trimmers—

Bonney's.....	75¢10.00, 50%
Stearns.....	20¢10%
Ives, No. 1, \$15.00; No. 2, \$12.00.....	75¢10%
Douglas.....	75¢10.00, 20%
Cincinnati.....	25%

Spoons and Forks—

Tinned Iron—	
Basting, Cen. Stamp. Co.'s list.....	70¢10%
Solid Table and Tea, Cen. Stamp. Co.'s list.....	70¢10%
Buffalo S. S. & Co.....	70¢10%
Silver-Plated (4 mos. or 5¢ cash 30 days).....	70¢10%

Meriden Brit. Co., Rogers.....	40, 15, 10¢5%
C. Rogers & Bros.....	40, 15, 10¢5%
Rogers & Bro.....	40, 15, 10¢5%
Reed & Barton.....	50%
Wm. Rogers Mfg. Co.....	50¢10¢60%
Simpson, Hall, Miller & Co.....	40, 15, 10¢5%
Holmes & Edwards Silver Co.....	60¢10¢5%
L. Boardman & Son.....	50¢10%

Miscellaneous.

Holmes & Edwards Silver Co.: No. 67 Mexican Silver.....	50¢10¢5%
No. 30 Silver Metal.....	50¢10¢5%
No. 24 German Silver.....	50¢10¢5%
No. 50 Nickel Silver.....	50%
No. 49 Nickel Silver.....	50¢10%
German Silver.....	50¢50¢5%
German Silver, Hall & Eiton.....	50¢5%
Britannia Silver.....	50¢50¢10¢5%

Boardman's Nickel Silver.....	50%
Boardman's Britannia Spoons, case, lots.....	60%

Springs—

Elliptic, Concord, Platform and Half Scroll.....	60¢60¢5%
Cliff's Bolster Springs.....	25%

Squares—

Steel and Iron.....	75¢10¢80%
Nickle-Plated.....	full ex. 10%
Try Square and T Bevels.....	60¢10¢60¢10%

Disston's Try Square and T Bevels.....	45¢10%
Winterbottom's Try and Miter.....	30¢10%
Starrett's Micrometer Caliper Squares.....	25%
Avery's Flush Bevel Squares.....	40%
Avery's Bevel Protractor.....	50%

Standard Fibre Ware—

	Per Dozen.	Plain.	Decor'd
Wash Basins, 10½ in.....	\$2.00	\$2.25	
Wash Basins, 12 in.....	2.25	2.75	
Keelers, 11½ in.....	4.00		
Cuspidors.....	8.00		
Spittoons, "Daisy," 8 in.....	4.00	4.50	
Peck Measure.....	4.00		
Half-peck Measure.....	3.50		
See also Falls.			

Staples—

Fence Staples, Galvanized.....	Same price as Barb Wire
Fence Staples, Plain.....	See Trd. Rep.
Steelyards.....	40¢10¢50%

Stocks and Dies—

Blacksmith's.....	30¢5¢30¢10%
Waterford Goods.....	30¢5¢30¢10%
Butterfield's Goods.....	30¢5¢30¢10%
Lighting Screw Plate.....	25¢30%
Reece's New Screw Plates.....	33¢25¢40%
Reversible Ratchet.....	25%
Gardner.....	25%

Stone—

Hudsonstone No. 1, 3¢; Axe, 3½¢; Slips No. 1, 4½¢.....	25%
Sand Stone.....	25%
Washita Stone, Extra.....	19¢20¢
Washita Stone, No. 1.....	14¢15¢
Washita Stone, No. 2.....	10¢11¢
Washita Slips, No. 1, Extra.....	36¢38¢
Washita Slips, No. 1.....	24¢25¢
Arkansas Stone, No. 1, 4 to 6 in.....	11.50
Arkansas Stone, No. 1, 6 to 9 in.....	11.50
Turkey Oil Stone, 4 to 8 in.....	4.00
Turkey Slips.....	\$1.00, 1.50
Lake Superior Chase.....	16¢
Lake Superior Slips, Chase.....	31¢32¢
Seneca Stone, Red Paper Brand.....	16¢20¢
Seneca Stone, High Rounds.....	20¢25¢
Seneca Stone, Small Whets.....	25¢

Stove Polish—

Joseph Dixon's.....	75¢10.00, 10%
Gem.....	75¢10.00, 10%
Gold Medal.....	75¢10.00, 10%
Mirror.....	75¢10.00, 10%
Lustro.....	75¢10.00, 10%
Ruby.....	75¢10.00, 10%
Blazing Sun, 5 gr 10 lb.....	75¢10.00, 10%
Dixon's Plumbago.....	75¢10.00, 10%
Boynton's Noon Day.....	18.00
Parlor Pride Stove Enamel.....	75¢10.00, 10%
Yates' Liquid, 3 3 10 gal.....	8¢
Yates Standard Paste Polish, 10 lb cans.....	15¢
Jet Black.....	75¢10.00, 10%
Japanese.....	75¢10.00, 10%
Fireside.....	75¢10.00, 10%
Diamond O. K. Enamel.....	75¢10.00, 10%
Bonnett's Liquid Stove Polish.....	75¢10.00, 10%
Bonnett's Paste Stove Polish.....	75¢10.00, 10%
Black Eagle Benzine Paste, 5 and 10 lb cans.....	12¢
Black Jack Water Paste, 5 and 10 lb cans.....	12¢
Nickle Plate Paste.....	75¢10.00, 10%

Tacks, Brads, &c.—

List Oct. 10, 1889, extra 10¢2 ½ cash.	
Carpet Tacks—	
American Iron, Blued.....	70%
American Iron, Tinned or Cop'd.....	70%
Steel, Plain or Bright.....	70%
Steel, Tinned or Coppered.....	70%
Swedes Iron, Blued.....	70%
Swedes Iron, Tinned or Cop'd.....	70%
American Iron Cut Tacks.....	70%
Swedes Iron Upholster's Tacks, S. S.....	70%
Swedes Iron Upholster's Tacks, Tinned, S. S.....	70%
Swedes Iron Card and Upholsterers' Tacks, Lanc.....	60%
Swedes Iron Card and Upholsterers' Tacks, Tinned, Lanc.....	60%
Gimp and Lace Tacks Lanc, Swedes Iron.....	60%

Gimp and Lace Tacks, Lanc., Swedes Iron, Tinned.....	60%
Gimp and Lace Tacks, S. S.....	70%
Gimp and Lace Tacks Tinned, S. S.....	70%
Swedes Iron Basket or Trimmers' Tacks, Lanc.....	60%
Miners' Tacks, S. S.....	70%
Bill-Posters' or Railroad Tacks, Lanc.....	60%
Swedes.....	60%
Bill-Posters' or Railroad Tacks, S. S.....	70%
Copper Finish.....	50%
Copper Finish & Trunk Nails.....	50%
Clear Box Nails.....	50%
Zinc Glaziers' Points.....	50%
Picture-Frame Points.....	50%
Sinking-Glass Tacks.....	50%
Brush Tacks.....	50%
Tin-Capped Trunk Nails.....	50%
Finishing Nails.....	50%
Trunk & Clout Nails, Black & Tin'd.....	60%
Common and Patent Brads.....	60%
Hungarian Nails.....	60%
Basket and Chair Nails.....	60%
Carpet Carpet Tacks.....	40%
Miscellaneous—	
Double-Pointed.....	82½¢
Wire Carpet Nails.....	50¢10%
Wire Brads & Nails, see Nails, Wire.....	
Steel-Wire Brads, R. & E. Mfg. Co.'s list.....	50¢10%

Tap Borers—

Common and Hind.....	20¢10%
Ive's Tap Borers.....	33¢25%
Enterprise Mfg. Co.....	20¢10¢30%
Clark's.....	33¢25%

Tapes, Measuring—

American.....	33¢40¢33¢25%
Spring.....	40%
Chesterman's, Regular list.....	25¢30%

Thermometers—

Tin Case.....	80¢80¢10%
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Thimble Skeins—See Skeins.

Ties, Bale—Steel

Standard Wire, list.....	50¢10¢5%
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Tinner's Shears, &c.—

Shears and Snips (P. S. & W.).....	20¢25%
Punches, see Punches.....	
Snips, J. Mallinson & Co.....	33¢4%

Tinware—

Stamped, Japanned and Plated, list Jan. 20 1887.....	70¢10¢70¢10¢5%
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Tire Benders, Upsetters, &c.—

Stoddard's Lightning Tire Upsetters.....	15%
Detroit Perfected Tire Bender.....	15%

Tobacco Cutters—

Champion.....	20¢10¢30%
Wood Bottom.....	75¢10.00, 50¢25%
All Iron.....	75¢10.00, 50¢25%
Nashua Lock Co's.....	75¢10.00, 50¢25%
Wilson.....	55%
Sargent's.....	75¢10.00, 50¢25%
Acme.....	75¢10.00, 50¢25%

Transom Lifters—

Wellensack's: Class 3 and 4, Bronzed Iron.....	50%
Class 3 and 4, Bronze Metal.....	25%
Class 3 and 4, Brass.....	35%
Class 3 and 4, Steel.....	35%
Crown, Eagle and Shield.....	30%
Reith's, list Aug. 1, 1889.....	50¢10¢10¢2%
Bronzed Iron Rods.....	30%
Brass, Real Bronze or Nickel Plate.....	30%
Excelsior.....	50¢10¢10%
Shaw's.....	50¢10%
Pawson's Universal.....	40¢40¢10%

Traps—

Game—	
Newhouse.....	40¢40¢5%
Oreida Pattern.....	70¢10%
Game, Blake's Patent.....	40¢10¢5%
Mouse and Rat—	
Mouse Wood Choker.....	75¢10.00, 11¢12¢
Mouse, Round Wire.....	75¢10.00, 10%
Mouse, Cage Wire.....	75¢10.00, 10%
Mouse, Catch-em-alive.....	75¢10.00, 10%
Mouse, Bopanza.....	75¢10.00, 10%
Mouse Delusion.....	75¢10.00, 10%
Rat, Decoy.....	75¢10.00, 10%
Ideal.....	75¢10.00, 10%
Hotchkiss Metallic Mouse & Hole Traps.....	75¢10.00, 10%
Hotchkiss New Rat Killer.....	75¢10.00, 10%

Trowels—

Lothrop's Brick and Plastering.....	25¢25¢5%
Reed's Brick and Plastering.....	15%
Diston's Brick and Plastering.....	25¢25¢10%
Pence's Plastering.....	25%
Clement & Maynard's.....	25%
Rose's Brick.....	25%
Brade's Brick.....	25%
Worral's Brick and Plastering.....	25%
Garden.....	70%

Triers—

Butter and cheese.....	25%
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Trucks, Warehouse, &c.—

B. & L. Block Co.'s list, '83.....	40%
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Tubes, Boiler—

CURRENT METAL PRICES.

JANUARY 22, 1890.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
1 to 2 in. round and square...	2.00 @
1 to 6 in. x 1/2 to 1 in.	2.00 @
Refined Iron:	
1 to 2 in. round and square...	2.20 @
1 to 4 in. x 1/2 to 1 in.	2.20 @
1 to 6 in. x 1/2 to 1 in.	2.20 @
1 to 6 in. x 1/2 and 5-16	2.40 @
Rods—1/2 and 1-16 round and sq.	2.30 @
Bands—1 to 6 x 3-16 to No. 12	2.50 @
"Burden Best" Iron, base price	3.00 @
Burden's "H. B. & S." Iron, base price	3.00 @
"Uster"	3.00 @
Norway Rods	4.00 @ 5.00

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots	2 1/2 @
Best Cast Steel, base price in small lots	3 @
Best Cast Steel Machinery, base price in small lots	5 @

Sheet Iron from Store.

Common American.	R. G.	Cleaned.
10 to 16	3.00 @	3.50 @
17 to 20	3.25 @	3.50 @
21 to 24	3.50 @	3.75 @
25 and 26	3.75 @	3.75 @
27	3.85 @	4.00 @
28	3.75 @	4.25 @
Galv'd, 14 to 20	5.00 @	4.75 @
Galv'd, 21 to 24	5.37 1/2 @	5.12 1/2 @
Galv'd, 25 to 26	5.75 @	5.50 @
Galv'd, 27	6.12 1/2 @	5.85 1/2 @
Galv'd, 28	6.50 @	6.23 @
Patent Platinized	10 @	10 @
Russia	9 1/2 @	9 1/2 @
American Cold Rolled B. B.	5 @	7 @
Craig Polished Sheet Steel	8 1/2 @	8 1/2 @

English Steel from Store.

Best Cast	15 @
Extra Cast	16 1/2 @
Swaged, Cast	16 @
Best Double Shear	15 @
Blister, 1st quality	12 @
German Steel, Best	10 @
3d quality	9 @
2d quality	8 @
Sheet Cast Steel, 1st quality	15 @
2d quality	14 @
3d quality	12 1/2 @

METALS.

Sanca, Pigs	23 @
Straits, Pigs	22 @
English, Pigs	22 @
Straits in Bars	22 1/2 @

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melton Grade.	
IC, 10 x 14	6.50 @
IC, 12 x 12	6.75 @
IC, 14 x 30	6.50 @
IC, 20 x 28	13.00 @
IX, 10 x 14	8.00 @
IX, 12 x 12	8.25 @
IX, 14 x 30	8.40 @
IX, 20 x 28	15.75 @
DC, 12 1/2 x 17	6.00 @
DX, 12 1/2 x 17	7.50 @
Calland Grade	6.50 @
IC, 10 x 14	6.75 @
IC, 12 x 12	6.40 @
IC, 14 x 30	7.65 @
IX, 10 x 14	7.90 @
IX, 12 x 12	7.65 @
IX, 14 x 30	5.60 @
IC, 10 x 14	5.75 @
IC, 12 x 12	5.60 @
IC, 14 x 30	11.00 @
IX, 10 x 14	6.75 @
IX, 12 x 12	6.90 @
IX, 14 x 30	6.75 @
IX, 20 x 28	13.50 @
DC, 12 1/2 x 17	5.30 @
DX, 12 1/2 x 17	6.00 @

Coke Plates.—Bright.

Steel Coke.—IC, 10 x 14, 14 x 30	5.12 1/2 @
10 x 20	7.25 @
20 x 28	10.25 @
IX, 10 x 14, 14 x 30	6.10 @
BV Grade.—IC, 10 x 14, 14 x 30	4.87 1/2 @

Charcoal Plates.—Terne.

Dean Grade.—IC, 14 x 30	5.10 @
20 x 28	10.25 @
IX, 14 x 30	5.90 @
20 x 28	11.80 @
Abecarne Grade.—IC, 14 x 30	4.87 1/2 @
20 x 28	9.87 1/2 @
IX, 14 x 30	5.80 @
20 x 28	11.60 @

Tin Boiler Plates.

IX, 14 x 26	112 sheets	\$18.00 @ \$13.00
IX, 14 x 28	112 sheets	13 @
IX, 14 x 31	112 sheets	14.75 @

Copper.

Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ 1/2 B. Manufactured (including all articles of which Copper is a component of chief value), 45¢ ad valorem.	
Ingot	15 @
Baltimore Grade	14 @

Prices adopted by the Association of Copper Manufacturers of the United States, December 5, 1889, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound.							
			Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	22	22	22	22	22	22	22	22	22	22
30—72	22	22	22	22	22	22	22	22	22	22
30—90	22	22	22	22	22	22	22	22	22	22
30—96	22	22	22	22	22	22	22	22	22	22
48—96	22	22	22	22	22	22	22	22	22	22
48—96	22	22	22	22	22	22	22	22	22	22
60—96	22	22	22	22	22	22	22	22	22	22
60—96	22	22	22	22	22	22	22	22	22	22
84—96	22	22	22	22	22	22	22	22	22	22
84—96	22	22	22	22	22	22	22	22	22	22
Over 84 in. wide	22	22	22	22	22	22	22	22	22	22

All Bath Tub Sheets.... 16 oz. 14 oz. 12 oz. 10 oz.
Per pound..... 0.25 0.27 0.29 0.32
Bolt Copper, 1/2 inch diameter and over, per pound..... 22¢
Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.
Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.
Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.
Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.
Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.
Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier	26 @
12 ounce and up to 14 ounce to square foot	27 @
10 ounce and up to 12 ounce	29 @
Circles less than 8 inches diameter 2 cents per pound additional.	
Circles over 13 inches diameter are not classed as Copper Bottoms.	

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each	34 @
Tinning sheets on one side, 30 x 60 each	30 @
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each	15 @
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each	12 @
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each	10 @
Tinning sheets on one side, other sizes, per square foot	24 @
For tinning both sides double the above prices.	

Planished Brass and Copper.

14 and 16 oz. and heavier	31¢ By the case
12 oz. and lighter	24 x 48 and 30 x 60
14 and 16 oz. and heavier	44¢ 12 oz.

Seamless Brass and Copper Tubes.

O. G.	N. G.	1/2	3/4	1	1 1/4	1 1/2
8-14	6-12	37	33	30	28	27
15	13	38	33	31	29	28
16	14	39	34	32	30	29
17	15	40	35	33	31	30
18	16	42	36	34	32	31
19	17	43	37	35	33	32
20	18-19	44	39	37	35	34
21	20	46	41	39	37	36
22	21	48	43	40	38	37
23	22	50	44	42	41	40
24	23	53	46	44	43	41
25	24	56	49	46	45	43

Copper, Bronze and Gilding Tube, 3¢ 1/2 B. additional.

Brazed Brass Tubing. (To No. 20, inclusive.)
Above 5-16 inch to 3 inch, inclusive

Plain, above 3 inch

Plain, 5-16 inch

Plain, 1/4 inch

Plain, 3-16 inch

Plain, 1/2 inch

Fancy Tubing, Brass, to No. 20, inclusive

Bronze Tubing, 3¢ 1/2 B. more than Brass.

Discount from list

Roll and Sheet Brass.

Discount from list

High Brass Rods.

Over 1 inch diameter

1/4 inch to 1 inch diameter, both inclusive

No. 8 and less than 1/4 inch diameter

Smaller than No. 8

Hexagon, Octagon and Square, 2¢ 1/2 B. advance over Round Rods.

Splinter.

Duty: Pig, Bars and Plates, \$1.50 @ 100 B.

Western Splinter

"Bergenport"

"Bertha"

Zinc.

Duty: Sheet, 2 1/2¢ @ 100 B.

600 lb casks

Per B